

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

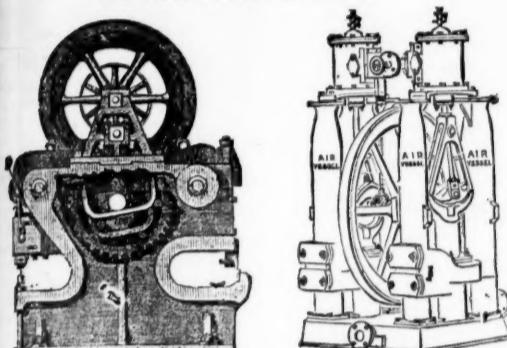
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No. 2206.—VOL. XLVII.

LONDON, SATURDAY, DECEMBER 1, 1877.

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PARIS,
BRONZE MEDAL, 1867.



ORDER OF THE CROWN OF PRUSSIA.

SILVER MEDAL, 1867



FALMOUTH,

SILVER MEDAL, 1867

A DIPLOMA—HIGHEST OF ALL AWARDS—given by the Geographical Congress, Paris, 1875—M. Favre, Contractor, having exhibited the McKean Drill alone as the MODEL BORING MACHINE for the ST. GOTTHARD TUNNEL.

SILVER MEDAL of the Highland and West of Scotland Agricultural Society, 1875—HIGHEST AWARD.

At the south end of the St. Gotthard Tunnel, where

THE MCKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecutive weeks, ending February 7, was 24·90, 27·60, 24·80, 26·10, 28·30, 27·10, 28·40, 28·70 metres. Total advance of south heading during January was 121·30 metres, or 133 yards.

In a series of comparative trials made at the St. Gotthard Tunnel, the McKean Rock Drill continued to work until the pressure was reduced to one-half atmosphere ($7\frac{1}{2}$ lbs.), showing almost the entire motive force to be available for the blow against the rock—a result of itself indicating many advantages.

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WASTE HEAPS, consisting of refuse cherts and skimpings of a former washing, containing a mixture of lead, blende, and sulphur DRESSED TO A PROFIT.

Mr. BAINBRIDGE, C.E., of the London Company's Mines, Middletons-in-Teesdale, by Darlington, writing on the 20th March, 1876, says:—"The yearly profit on our Nanthead waste heaps amounted last year to £600, besides the machinery being occupied for some months in dressing ore-stuff from the mines. Of course, if it had been wholly engaged in dressing wastes our returns would have been greater; but it is giving us every satisfaction, and bringing the waste heaps into profitable use, which would otherwise remain dormant."

Mr. T. B. STEWART, Manager of the Duke of Buccleuch's Mines, Wanlockhead, Abington, N.B., writing on 20th March, 1876, says:—"I have much pleasure in stating that a full and superior set of our Ore Dressing Machinery has been at work at these mines for fully a month, and each day as the moving parts become smoother, and those in charge understand the working of the machinery better, it gives increasing satisfaction, the ore being dressed more quickly, cheaply, and satisfactorily than by any other method."

Mr. BAINBRIDGE, speaking of machinery supplied Colberry Mines, says:—"Your machinery saves fully one-half on old wages, and vastly more on the wages we have now to pay. Over and above the saving in cost is the saving in ore, which is a full much short of 10 per cent."

GREENSIDE MINE COMPANY, Patterdale, near Penrith, say:—"The separation which they make is complete."

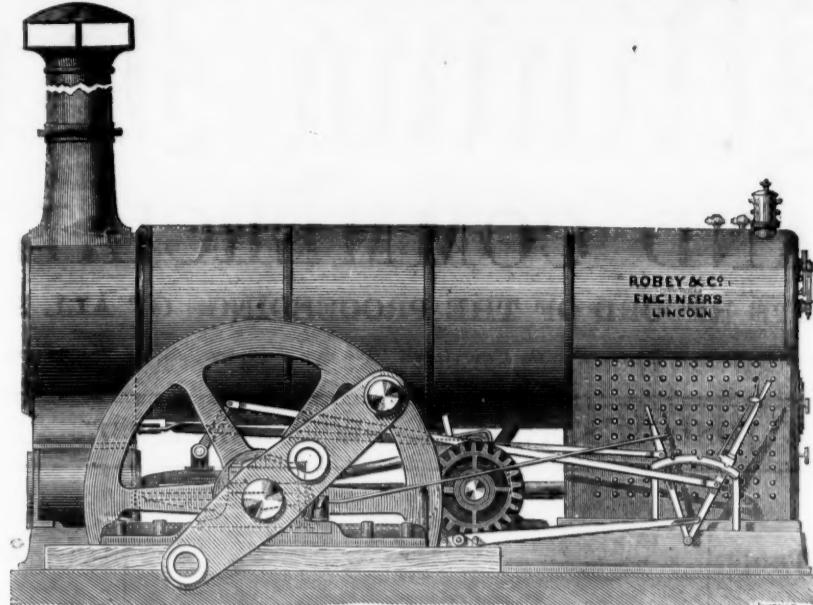
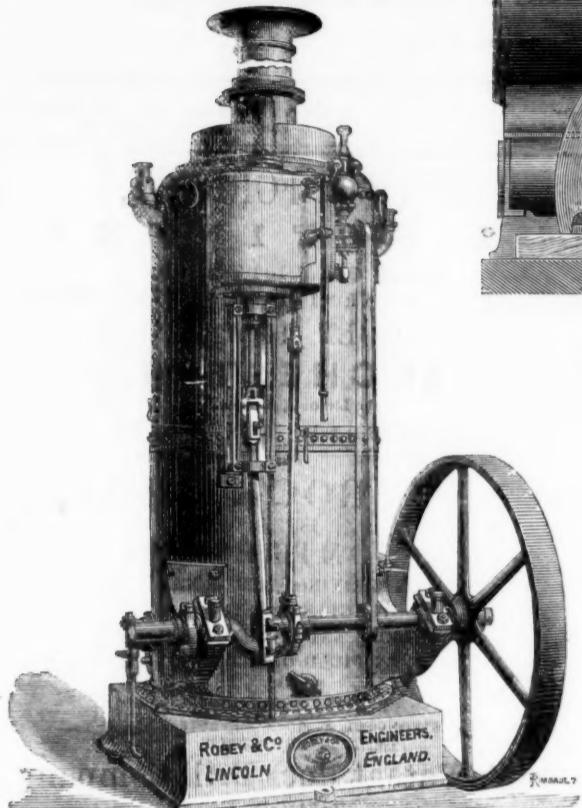
Mr. MONTAGUE BEALE says:—"It will separate ore, however close the mechanical mixture, in such a way as no other machine can do."

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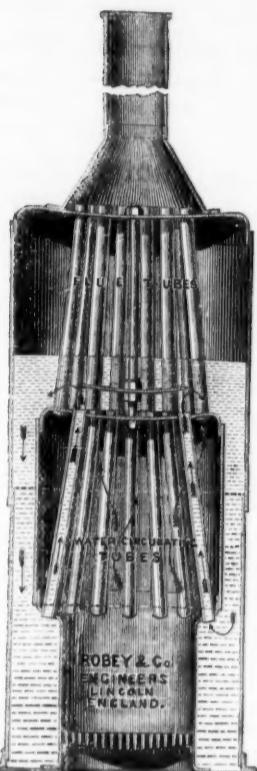
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"7. Its greater power is some FORTY PER CENT. in favour of the Ingersoll."

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Extract from Capt. DRAKE'S Report to the Eberhardt and Aurora Mining Company, London:—"After having visited and carefully inspected the working of the principal patterns of drills used, particularly with reference to the tunnel works in the Comstock Mines, in California, we are pleased to believe there is no better drill than the 'Cranston,' which is doing most excellent service. The tunnel is driving through exceedingly hard limestone intermixed with quartz rock, which is all to blast. Since the arrival of new drills we have been enabled to let a contract for 500 feet, and we now average 50 feet per week."

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Original Correspondence.

COLLIERY MANAGERS, AND SCIENCE AND ART EXAMINATIONS.

SIR.—Will you allow me to write a few lines in your valuable Journal, on a subject of considerable interest to myself and, I believe, to many others? A few weeks since the secretary of the examination board for Lancashire under the Coal Mines Act was asked if a gentleman who, in addition to holding several Government certificates for mining and other sciences from the School of Mines and the Science and Art Department, South Kensington, had worked as a miner underground in metalliferous mines, and had also been manager of the same for some years, would be eligible for examination; to which the secretary replied that in one district of Lancashire a candidate must have three years' underground work in a coal pit, and in another district five years, thus ignoring Government science examinations altogether, and not allowing years spent underground in iron and other metalliferous mines to count for anything. Now, in the first place, I should like to know, and I trust someone will explain the reason, why a longer time underground is required by one board of examiners than by another, seeing that the candidate can be examined in any district he may think fit, and, if competent, will receive the certificate, which will serve him for any part of Great Britain. Surely, under these circumstances, it seems to me more sensible to have the same regulations in every district, and it would then be both fairer and more easily understood than at present. Again, of what use is it to attend the lectures at the School of Mines, pass sundry examinations there and at South Kensington—both Government establishments—if no notice is taken of these certificates by the Government board of examiners. Persons are not generally fond of working for examinations merely for amusement, and certainly they have a right to expect, if they pass, to get some benefit from them; but as far as I can learn, and I hope I may be wrong, the colliery examiners completely ignore such certificates, although questions asked in mining, both at the School of Mines and South Kensington, are quite as difficult, if not more so, than many questions given at several examinations under the Act.

I willingly acknowledge that practical experience underground is very necessary, but surely a man who has passed several examinations ought to be permitted to go before the board sooner than a man who has not. Besides, some persons learn more in one year than others in three or five, and therefore the rule appears most unfair. Why should not candidates be eligible on paying their fees, and by all means let the questions be as searching as the examiners may think proper, and I do not think persons who have little or no chance of passing would care to spend their money foolishly. I fancy one reason, and perhaps the principal, why these rules are so strictly observed is that they enable the influential mining engineers to get far more in premiums than they otherwise would from their pupils because they have to serve longer time.

And now I come to another point. Surely metalliferous mining ought to count for something, for no one can suppose that a rainer, be he from Cornwall or elsewhere, is as ignorant of underground work in a coal pit as a youth fresh from school, yet no allowance seems to be made in his favour. Further, I have always understood that Mr. Warington W. Smyth advocates a knowledge of both kinds of mining. Certainly in his lectures and his examinations he embraces both, and last May, at South Kensington, out of his ten questions on the principles of mining—advanced stage—there were six which related entirely to coal mining. I think most of your readers will agree that a metalliferous miner, or a person who has already obtained certain mining certificates, ought to be allowed to present himself for examination long before a man who has no such qualification, and I trust that whatever rules have been made, or will be hereafter, by the examiners, they will be published, so that myself and others may no longer remain in the dense fog in which we are at present with regard to these examinations.

— A METALLIFEROUS MINER.

ELECTION OF GOVERNMENT INSPECTORS OF MINES.

SIR.—In continuation of my first letter I now beg to draw your attention to the system of electing Government Inspectors of Mines, and to point out a late modification of such system under which the last Assistant-Inspector was elected.

The "general regulations" governing the open competitive examinations for Inspectorships of Mines are the same as those framed in pursuance of Her Majesty's Order in Council of June 4, 1870, and under which all open competitive examinations for situations in the Civil Service are held.

The "special regulations" which govern the open competitive examinations for Inspectorships of Mines are as follows:—

I.—The limits of age for this situation are as follows—23 and 35. Candidates must be of the prescribed age on the first day of the examination.

II.—The examination will be on the following subjects—

- 1.—Handwriting.
- 2.—Orthography.
- 3.—Arithmetical (including vulgar and decimal fractions).
- 4.—English composition.
- 5.—Theoretical and practical acquaintance with coal mines and mining.

* Candidates failing in any of the above subjects will not be eligible.

Optional,

6.—A knowledge of metalliferous mines.

III.—No person will be qualified as a candidate who has not within five years previous to his application been employed for two years underground in a coal mine.

IV.—A fee of £1. will be required from each candidate attending the examination.

Civil Service Commission, Nov. 4, 1873.

The first batch of Assistant-Inspectors were elected before the date of the special regulations, as the following will show.

The cases dealt with up to June 30, 1873, were as follows:—

Inspectors of Coal Mines.	Inspectors of Metalliferous Mines.
General total	27
Candidates who were absent, declined, or withdrew.	3
Ditto ditto rejected on examination	2
Ditto ditto unsuccessful in competition	1
For whom certificates were granted (after nomination)	13
The following list shows in alphabetical order the persons elected to this examination, together with the dates of their certificates.	2
Atkinson, John Boland	1873—March 11
Bell, Thomas	March 29
Cadman, Thomas	Feb. 13
Dickinson, Thomas Lidney	April 5
Evans, Thomas Fanning (Metalliferous)	Feb. 25
Foster, Clement Le Neve (Metalliferous)	March 15
Galloway, William	April 14
Gray, Thomas	Feb. 13
Griffith, Nathaniel Robert	April 30
Hall, Henry	Feb. 12
Liddell, Gerard Henry	April 3
Martin, Joseph Samuel	Feb. 17
Robson, Joseph Thomas	May 5
Scott, William Beattie	June 25
Meers, Gray, Griffith, and Liddell, for some reason best known to themselves, do not seem to have acted upon their certificates, and on Tuesday, Dec. 16, 1873, the first open competition for situations as Inspectors of Coal Mines was held. The difference in the number of candidates at the close and open competitions is rather marked:—	April 2
General total	57
Candidates who were absent, declined, or withdrew	21
Ditto ditto unsuccessful in competition	33
Ditto, yet to appear, or still under consideration	3

Certificates for these three were not granted until Jan. 12, 1874, when it appeared the following had been elected:—

Gerard, John.
Hedley, John Laidler.
Stokes, Arthur Henry.

The next open competition took place on March 3, 1874:—

General total	21
Candidates who were absent, declined, or withdrew	7
Ditto ditto unsuccessful in competition	13
The analysis of this examination is as follows:—	
Name or number	Arith. Ortho. Hand- English Coal Metallif. Total
of candidate	metric. graphy. writing. comp. mining. mining.
Maximum 150	100 100 150 1000 300 1800
Gilrov, S. B.	55 80 130 760 — 1105
No. 2	135 65 110 550 — 960
3	71 60 120 580 — 891
4	73 — 60 607 — 860
5	124 — 55 630 36 845
6	127 90 75 110 440 — 812
7	133 80 62 85 397 — 757
8	108 70 65 95 — 75 413

The six other candidates failed in one or more of the prescribed subjects.

The next open competition took place on Jan 29, 1875. The analysis is as follows:—

Name or number	Arith. Ortho. Hand- English Coal Metallif. Total
of candidate	metric. graphy. writing. comp. mining. mining.
Maximum 150	100 100 150 1000 300 1800
Ronaldson, J. M.	116 90 83 105 603 — 997
No. 2	83 — 58 105 750 129 1125
3	40 65 100 577 — 847
4	48 65 120 506 — 797
5	89 60 70 470 — 794
6	33 65 60 597 — 775
7	7 75 60 90 497 — 729
8	59 25 50 507 — 716
9	129 50 55 75 377 — 686
10	32 40 55 90 463 — 680
11	76 65 75 113 323 — 652
12	72 55 78 100 340 — 645

One other candidate failed in one or more of the prescribed subjects.

Neither my time nor your space will admit of my dealing this week with several points suggested by the foregoing particulars. I hope to be able to do this shortly, and to give your readers an idea of the style of examinations laid down by the Civil Service Commissioners for the post of Inspector of Mines.

CARBON.

COLLIERY EXPLOSIONS.

SIR.—Being at the head of a large mining company, whose mines I personally manage, I may, without presumption, claim knowledge and experience in my profession, which will, perhaps, justify my venturing to add a few practical remarks to what has been published by you and other technical periodicals with reference to colliery explosions.

In the *Mining Journal* of Nov. 3 I read an able article, signed "J. D. Shakespear," in which the writer so justly remarks that safety-lamps only mitigate danger where fire-damp exists, but do not absolutely guard against explosion. I wish to take up the argument where Col. Shakespear leaves it, and analyse the effects of fire-damp on safety-lamps of various models. It is quite true that flame, moving with the velocity of from 6 to 9 ft. per second, will pass through the wire gauze of an ordinary safety-lamp; this velocity may be created by a man either running with or swinging his lamp accidentally.

The form of an ordinary Davy lamp is such that the phenomena created in it by the presence of fire-damp may induce many an inexperienced workman to run, or to drop his lamp, precisely at the moment when the danger is greatest, thereby creating such motion in the flame as to produce explosion. In a Davy lamp the flame becomes smoky and lengthens when in 1 volume of air there is less than 0.08 volume of fire-damp; when the proportion of this gas becomes 0.09 the flame returns to its original dimensions, but a cylinder of bluish flame rises up to the upper portion of the lamp; when the said proportion is 0.10 the flame of the wick disappears completely, and the lamp fills with a blue flame; the same phenomenon is produced when 0.11 and 0.125 of fire-damp exist in the air, in which proportions the mixture is excessively explosive. When a Davy lamp fills with flame, and if an alarmed workman drops it, or runs with it to get (as he thinks) out of danger, without taking the precaution of protecting his lamp with his hat or coat, or having the presence of mind to extinguish it without blowing it out, in such cases a terrific accident may occur; as also when the flame of the wick is carried through the wire gauze by an accidental current of air, though the proportion of fire-damp in the air be not so great as to produce the filling of the Davy lamp with flame.

These two motives for the unsafety of an ordinary Davy lamp are to a great extent done away with by the use of other lamps, with which the colliery managers should be made acquainted, and the adoption of which should be enforced by public opinion if not by absolute regulations. The source of danger which arises in a Davy from the effect of the flame of the wick passing through the wire gauze, if bent by a current of air, is efficiently avoided by the use of other lamps (as, for instance, Roberts's), in which for about two-thirds of the height of the lamp the wire gauze is either enveloped or entirely replaced by a strong glass tube. The difference between the cost of such lamps and ordinary Davy lamps is so small that no colliery manager is justified, in my opinion, in hesitating between the two; and thus avoiding one of the many sources of danger which surround the miner, especially as the increase of the light given by such lamps makes the use of safety-lamps less inconvenient, hence the workman is less reluctant to adopt it. The danger arising from the effects of a Davy lamp filling with flame (precisely when the consequences of an explosion would be most terrific) is almost entirely done away with in the Mueseler safety-lamp. In this lamp the flame is surrounded by an envelope of strong glass, surmounted by one of wire gauze. The air necessary to the combustion enters through the wire gauze, descends the side of the glass, or enters through exceedingly small holes left at the bottom. The products of combustion ascend through a thin conical chimney placed in the centre of the lamp above the flame.

In this lamp when there is 0.067 volume of fire-damp in 1 volume of air the flame loses its brightness; with 0.085 of fire-damp the flame diminishes still further in height and brightness, and the lower part of the flame acquires a great development, while the top becomes smoky, and is surrounded by whitish aureola. The flame periodically almost entirely disappears, and an inverted cone of blue flame is visible, resting with one end on what remains of the flame of the wick, and with the other on the bottom of the conical chimney. With 0.091 gas the same phenomena are visible, but the periodical extinctions of the flame are more frequent. With 0.10 of gas the flame rises up to the ring of wire gauze which is at the top of the lamp, which goes out. With 0.11 of gas the light does not go out, but the periods of oscillation between lighting up and almost extinction are very frequent. With 0.125 the flame reaches the top of the conical chimney again and then extinguishes.

From the description of these phenomena any practical miner will perceive that with the use of these lamps no such circumstances can occur in which, through carelessness, or a strong current of air, or the emotion produced by the lighting up of the air inside a Davy lamp, might be followed by a terrific accident. The sole objection to these lamps is their weight.

In Belgium, where special Government commissions have examined with unquestionable competency the comparative safety of the Davy and other lamps, the use has been recommended of such lamps in which the wire gauze is replaced by a strong glass cylinder in the lower part of the lamp, and in that country, where mining is carried on to a great extent and more than average practical and theoretical knowledge, Mueseler and Boty lamps (the latter being a modification of the former) are almost universally adopted.

Those colliery managers who are reluctant (notwithstanding the very extensive use of such lamps on the Continent) to adopt lamps with glass cylinders, should in preference to Davy lamps adopt the "Dubreuil" lamps, which are used in several mining districts of France. These lamps are made of wire gauze alone; when once

they are lit and closed it is impossible to open them without extinguishing the flame, the same screw serving to open the lamp and to lower the wick; these lamps have greater illuminating power, and burn longer, with equal brightness without requiring any attention.

My numerous occupations, and my apprehension to abuse of your space, induce me to refrain from further explanations, while I strongly recommend that every means should be used to acquaint colliery managers with such innovations in the construction of safety-lamps which science, confirmed by practice, can unhesitatingly recommend.

FRANCIS KOSUTH,
Civil and Mining Engineer.

THE LIGHTING OF COLLIERIES.

SIR.—It will not be out of place to draw the attention of all parties connected with colliery management to the subject of lighting up mines, which to a large extent is answerable for the loss of many valuable lives and loss of property. There is nothing connected with collieries in which such a diversity of opinion exists as the kind of light which ought to be used, the system to be pursued in their use, and rules to be observed. In many instances the lighting of collieries is much neglected, and has to contend with ignorance and prejudice in attempts to improve it. These may be strong remarks, but my own experience warrants them. It will be found on inquiry that it is customary in some districts for the men to purchase their own lamps and oil, and keep them under their own control. This is not likely to lead to the careful selection of a lamp, but that the lowest price will find most favour. The pawn-shop and marine-stores are not unfrequently visited for the purpose of providing the article of all others which is to protect the owner's life under certain conditions. The collier owning the lamp will naturally keep it in his own possession both when on and off work. Walk after the colliers, and it will be found the lamps do not receive the care that is necessary to keep them from damage; if raining, the gauze is damaged by becoming wet, and the cleaning they receive in most cases is of a very slight description. The fittings show very rough usage from one cause or another; the threads of the screw become worn away, and it is by no means uncommon to find the top part separated from the oil vessel; there are thousands of lamps in use to-day that are not fit to be used for the purpose they are intended. The lamps are to be locked; this in many cases consists simply of a screw; the key, a slot cut into a round key-shaped piece of iron; substitutes may be had by the hundred—a nail, bit of hard wood, penknife, &c.—in one instance a little lad showed how he could unlock his lamp with his shirt lap. The lamps are locked by the men; inspected by some competent person before they are allowed to go down. This is principally in giving the lamp a twist, and, if fast, returned. Two or three hundred men, possibly, have their lamps inspected, and not too much time is passed in this operation. The custom in some collieries is to go to the working places, and if found all right, unlock the lamp and light candles; in others, if gas is found to be given off, lamps only are used in a few stalls where the gas has been discovered. A short distance further on naked lights are used, although the ventilation may be travelling from the former to the latter. In cases where the firemen or deputies are allowed to carry a key, the lamp is opened and the light replaced by them—the station being where they may happen to meet. Again, take some collieries where the lamps are kept on the premises, any kind of a cabin is good enough; often in charge of some man long past work, or someone who has lost a limb, and who may be quite unsuited for the important post of lamp-man. It will at others be found that the cabin is in charge of mere lads, who know as much about the use and importance of carefully examining the lamps as they know about any scientific subject.

It must occur to thinking minds with some surprise, seeing that safety-lamps are used for the detection of gas, why they should not be used entirely as a preventive of explosions. If it is necessary to lock them, why should they not be locked so as to prevent their being tampered with? Why the improvements that have been made from time to time have not resulted in the safest lamp being adopted more speedily? The ordinary Davy lamp is a good lamp, and safe in the hands of competent men, but is known to be the most unsafe in those of a number of men taken haphazard. The men do not know the meaning of the various qualifications of a safety-lamp under all circumstances, and the cause of the various appearances they present at different times. The Clanny lamp is a far better lamp than the Davy lamp, giving a much better light. The Stephenson has proved itself under certain conditions to be a more efficient safety-lamp than either of the two. The Mueseler, if fairly examined, will give a greater number of advantages as regards safety and utility than any. It will take too much time to relate the various experiments which go to prove that in coal mines the Mueseler Protector is the most practical lamp, considering all points; and that the Davy Protector, with a glass shield, is by far the best description of safety-lamp for the fireman.

I have found great prejudice on the part of the men to change from the system they are accustomed to, whether from naked lights to lamps, or from lamps to an improved description—their argument is, unless it is safe to work with candles it is not safe to work at all. This may be true, but the unfortunate experience of years proves that it is not possible to provide for the pits being rendered perfectly harmless under all circumstances, and a pit may be safe to work with candles one minute, and in the course of an hour become so fouled with explosive gas that if brought into contact with a naked light an explosion would be the result. It is alleged the light is not sufficient, but this is a thing of the past. Lamps can be and are provided that give a superior light to a candle. There is a great want of knowledge on the part of some managers as to the use of a safety-lamp, and when everything has been demonstrated, and they are perfectly satisfied as to the increased safety to be gained by pursuing a certain course, confidence in their own judgment and strength of mind is required to carry out any improvement in opposition to the men. Again, the knowledge that the custom of a district would handicap them to too great

cannot be opened so as to expose the light, and that a seal shall be put on, to detect any lamp that has been opened.

5.—A certain number of lamps shall be sent down to each station, to replace those who may have lost their light; and that at intervals during the day the lamps without lights are to be sent to surface, for purpose of re-lighting.

6.—That the same lamp shall not be used two days running; night cleaning and trimming being dispensed with by two sets of lamps being provided.

7.—That the lamps shall be provided and maintained by the owners, who may charge so much per day for the use of them, and providing burning material.

8.—The lamp-room to be in the charge of a competent man and assistants, whose duty would be to light, lock, and give out the lamps which have been trimmed and examined the day before; after dispatching the men, to clean, trim, and examine the lamps that have been in use the day before. At the conclusion of their day, one man would be sufficient to take charge of lamp-room for the night, and give out such lamps as might be required for night-shift men.

9.—That it shall be the duty of someone each afternoon to inspect the lamps that have been trimmed for the same evening and following day.

10.—That at certain intervals the lamps shall be examined one by one by an independent party, and any that are not in good order condemned for repairs.

11.—That the lamp-room shall be of sufficient size, and fitted with cleaning and fitting benches, and other appliances for the performance of their work.

My reasons for these rules I have in part given, but, again to briefly state them, I will add the compulsory use of such a lamp as mentioned would practically prevent any exposure of a flame, and would resist a pressure of gas exceeding any ventilation that may cause a current of explosive gas to pass the flame through or ignite the surrounding gas, and would if surrounded by explosive gas inevitably extinguish the light. The perfect ventilation of the pit would have to be carried out to such an extent as to render harmless the gas, for without such an amount of ventilation it would be impossible to continue working the pit for want of light.

That the Davy lamp should be used by officials is because the explosive gas would most readily act upon the flame and show its presence. If locked in the way suggested would detect any attempt to open the lamp, and if even this were tampered with it would be impossible to extract a light. The extra supply of lamps to replace those that go out by accident may be readily obtained with little loss of time to the men. The double set of lamps would give sufficient time for cleaning and trimming the lamps in daylight, and allow of the competent inspection by the man in charge of lamp-room.

A second check by the party appointed for that purpose when cleaned and trimmed would be additional security. The night trimming of lamps is the cause of neglect in cleaning and examining.

It is nothing but natural that as soon as the lamps can be got ready the men working at night will take the earliest opportunity of getting some rest. Unless the man in charge is competent it is unreasonable to expect that he will be able to give the attention to them they ought to have, and detect their fault, or instruct his assistants how to proceed. The inspection in the afternoon would keep the lamp-man up to the mark, and effectually put an end to the continued use of lamps that are dangerously defective—hundreds of which are so at the present day in use.

Unless there is a proper lamp-room, well fitted with the necessary appliances, it is impossible to do justice to the lamps by anyone. Plenty of room is required. The lamps, if provided by the owners, would be the means of a better lamp being obtained; greater care would be taken of them, as any man having damaged his lamp would be detected, and if a charge for their use was made to the men the latter would see they got value for their money, and it would induce them to inspect more closely for the purpose of finding out any neglect on the part of the lamp-man. It may be said that the double set system would be very expensive, and more so than at present. This I will try to prove is not the case.

First, a less number of men would be required to trim (say) 500 lamps if done in the day time, than part in the day and part in the night. The lamps would cost double the amount of one set, but this would be next to nothing spread over the life of a lamp; for one set worked daily is not so well cared for, or lasts half the time on that account that two sets would.

Or, in other words, if 500 lamps would exist for three years used daily, 1000 lamps would last more than double the time worked alternate days; and, as I have stated, save some expense by requiring a less number of hands to do the work, if done in the day time. Taking a colliery using 500 lamps, 400 for day work, 100 for night, would require at least two men in the day and four for night. If 1000 were provided to supply these 500 lamps alternate day and night, it would not take more than three or four each day, and one at night—so that the saving would be two men. From calculations made, a colliery could be supplied with 1000 lamps, four lamp-men, and sufficient oil to allow each lamp to burn five days per week of sixty hours, giving a light superior to any other lamp, including wick, at a cost of 7d. per week per lamp; and, in addition, allow for the payment of a good man to visit (say) a number of collieries at least once per fortnight. In three years time the cost of the lamps would be covered, and for the following period of their existence would cost first for the same system to be pursued not more than 4d. per week. The cost of such lamps is much more expensive than the old system, at the same time they are so constructed as to render the striking of a match useless for the purpose of re-lighting, they will stand a greater pressure of gas, detect the presence of gas more distinctly, and give a better light than any other lamp. I do not pretend to say that the adoption of the Protector Mueseler lamp will be the means of preventing explosions in collieries entirely; but I do say that by carrying out such a system as previously stated, adopting the Protector, a superior lamp would diminish the number of such accidents to a very great extent. The number in daily use is sufficient proof that they have been largely appreciated. It is not on account of trade purposes that I claim your indulgence, but in order that anyone may investigate themself the truth of my remarks. Reference to opinions expressed in the leading journals for years back, will confirm what I will venture to state—that there is such a thing as prevention. It is for those in charge of collieries to take the first step, by meeting together and comparing their own experiences, invite suggestions from outsiders, carefully test every improvement, whether affecting the ventilation, firing, lighting, the use of barometers, &c., and when they decide upon a course that will fulfill a higher degree of safety—adopt it.

W. E. TEALE.

IMPROVED STAMPS.

SIR.—Reference was made in last week's *Mining Journal* to the exhibition at the Cornwall Mining Institute meeting of an improved system of annular stamp invented by Messrs. Harris and Rounswell, of Polmoria; and, although there is naturally a disposition on the part of those interested in the pneumatic and other stamps to shelve the invention, a description of it will leave no doubt as to its value. The inventors construct a stamper, or stamp head, of an annular form, so that when the same is used for crushing ore or other material the same, together with the water, when water is used, will come within the said annular head. The machinery, or apparatus, comprises a cylinder, to which the said stamper, or stamp head, is secured by a ring fitted to the periphery of the said cylinder, and the latter has connected with it any suitable or convenient number of lifters. They can combine any desired number of the annular stampers to form a stamp head, and may construct the same of any suitable material. By this improved construction the head may be made of greater weight, in proportion to the stamping surface, than heretofore, the only limit being with regard to the size of the parts, and convenience of working.

Whatever may be the size of the head the material to be acted upon is always first presented to the inner edge of the annular head, and passes under the entire width of the stamping surface; and, therefore, "rows," or "sand," may be stamped more effectually with this improved head than with others heretofore used. When water is used it will also be introduced in the centre of the stamp,

and the whole of the water must pass over the stamped or crushed material before escaping through the grating, or exit apertures, and thereby carries with it the pulverised material, and the water cannot escape without washing this material. The stamping face of any given width of head by this improved construction will be more than double that obtained with an ordinary head of the same width, and as the stamp head wears away the stamping is increased, and becomes more effective. They provide circular grating, which entirely surrounds the head, and thereby obtain the largest possible area. Any number of lifters may be employed in each head, the stability and weight of the same being increased in proportion to the number of these lifters.—*Bristol, Nov. 26.* ENGINEER.

THE TRIAL OF ROCK-DRILLS IN CORNWALL.

SIR.—Kindly allow us to explain in the Journal the matter of the so-called trial of the Barrow drill at South Roskear Mine on Friday the 22nd instant. On arriving at the Institute on Thursday afternoon we were informed for the first time that the officials had made arrangements for a trial of drills to take place on the following day at South Roskear, without thinking it necessary to inform us, but we presume with the previous concurrence of other parties interested. We then told them that we were not prepared for a trial, because the drill we exhibited was barely finished, had neither been tested nor proved, and had no fittings or drill-bit sent with it. On our being much pressed to allow a trial, we reluctantly consented for one of the Dolcoath men to arrange it, when it was found to require some adjustment, which could not be done on the spot, thus the trial was at an end. Therefore, it will be readily seen that under the circumstances a 10 minutes trial was no test whatever, for it cannot be pretended that a few minutes boring is in any sense a test, or that the drill which has been so long and successfully working in various mines requires to be tested in any such way.

We have never yet seen a drill that could not bore a hole of a few inches in depth, more or less rapidly, but how many are there that have proved their worth by continuous and successful working month by month in the hard rock of our mines? This is the real test. Our drill has regularly bored a much larger hole than either of those bored during the trial at the speed of 45 feet in eight hours. This includes all stoppages for changing bits, &c., and it continues to do this at its regular work during a shift of eight hours.

Liskeard, Nov. 28. LOAM AND SON.

BORING MACHINERY.

SIR.—In last week's Journal reference is made to a shaft here which is in course of sinking by rock-boring machinery. I write now merely to corroborate the statements made in Mr. King's letter, and not to give any additional facts. I am keeping a faithful record of everything in connection with the operation, and when the shaft is completed to the 60 fm. level a full and strict account shall be duly furnished.

JOHN BARKELL.

Rushen Mine, Isle of Man, Nov. 27.

TONITE, AND ITS ADVOCATES.

SIR.—Your Faversham correspondent, who signs himself "Fair," seems to think he is entitled to a monopoly of your pages. I doubt not that his connection with the press may entitle him to far greater opportunities of ventilating his opinions than I can command, and I can only regret that your kindness in admitting my letter should have aroused his spleen, and caused him somewhat inconsistently to charge me with rushing into print with old news, and at the same time complaining that I hastened to write immediately the information came to hand, and ten days only after the publication of the paper I referred to, being barely time to ascertain whether the statement it contained was true or not. Judging from the irritation which my communication appears to have occasioned him, it is evident he fancies it may have some effect on the judgment of others. I trust in this respect he may not be disappointed.

He reminds us that he is himself a not unfrequent contributor to your columns, and he quotes from two of his former letters, and triumphantly refers to one of them as containing the undeniable truth that "tonite" could be compressed by stemmung with a wooden or copper rammer." No one can doubt this, and if he had added that it can also be exploded by such stemmung unless exercised with extreme caution, he would only have asserted that which has unquestionably been proved before a jury in a case where a wooden rammer was used. He attributes the accident which occurred at the Montreal Mines, Cleator Moor, to the recklessness of the man who was operating with the tonite, and he assures us that the application of force is quite unnecessary, as one of the rules for its use is—"Take a cartridge the size of the bottom of the bore-hole." But what if the man is mistaken as to the contraction at the bottom of the hole, and the cartridge proves to be too large and sticks by the way before it gets there, an occurrence which every practical man knows frequently takes place. Will it then be safe to follow your correspondent's instructions, and "compress it by stemmung with a wooden or copper rammer?" I know not, and he must excuse me if I say that his advice is fraught with the very danger which the accidents referred to, including that at the Montreal Mines, have shown to be real, and he is not justified in volunteering it for adoption by miners.

Your correspondent assumes that I am a reader of the Journal, and I admit it, but I do not regularly file it, and, consequently, have not the means of refreshing my memory as to all its contents. If I mistake not, however, the propriety of his adopting the designation "Fair" was some time since questioned by a correspondent, who, in reply to one of his communications, suggested that he ought rather to have signed himself "Unfair," and I am disposed to think so after his reference to the article on Major Majendie's report on the Burnbank explosion, which your correspondent—"A Large Consumer of Dynamite"—has exposed as having been headed with a misleading title, and containing garbled statements.

Allow me, in conclusion, to suggest to your correspondent "Fair" that, instead of advising rash and dangerous proceedings in the stemmung of his favourite tonite, he would better serve the object he seems to have in view if he endeavoured to impress on all who use it, more powerfully than I am able to do, the necessity to stem it with great—

Truro, Nov. 27.

TONITE EXPLOSIVE.

SIR.—A letter appeared in the Journal a few weeks ago under the above heading by a correspondent who dates from Truro. Any person reading that letter can easily perceive that it smells very strongly of dynamite. Without the least cause your correspondent hunts up an old paper giving an account of an accident that happened over 12 months ago, through the recklessness of the unfortunate man who was killed, and would have the public believe that tonite is a dangerous explosive, when we have the evidence of her Majesty's Inspector of Explosives that tonite is the safest blasting-powder yet known. The action taken by some of the dynamite agents reflects no credit on them, and is such as the Cotton Powder Company would not tolerate from their agents. I cannot believe that the Dynamite Company are aware of the ungentlemanly acts of some of their agents.

One or two illustrations will serve to bring them up in their true colours. Some time ago one of the Cotton Powder Company's agents was giving some public experiments at the request of some gentlemen in removing tree stumps and boulder stones. An inquisitive officious person followed him the most of the day, finding fault with everything done. The agent turned round, and asked him who he was? He replied that he was the dynamite agent. The tonite agent asked him why he did not introduce himself when he first appeared on the ground. He said he did not think proper to do so. He asked liberty to test dynamite, but the gentleman on whose estate he was at once refused. I need not say the experiments gave perfect satisfaction.

Another dynamite agent called on a consumer of tonite, introduced himself to the proprietor, and represented that the tonite agent got killed by an accident from tonite. Fortunately the manager received a letter through the proprietor from the tonite agent

that morning or the one previous. When the deception was discovered the order for dynamite was at once cancelled, and the would-be wise man had a useless journey. Suffice it to say that they are now and have been using tonite for the last two years, without a single accident. The truth is that the dynamite agent got killed, and the person referred to thought by making a false statement in a strange place the deception would not be easily discovered.

An agent of the Cotton Powder Company was giving some experiments by special request a few days ago on the estate of a nobleman. After he had left the dynamite agent called, and wished to have similar experiments, which was refused. By next post the gentleman received a circular with a garbled and falsified report of the accident that happened in Cornwall about 12 months ago, and, strange to say, the very circular issued, I presume, with the knowledge of the Dynamite Company distinctly states that the impression was that the cap was in when the man was ramming down the tonite with an iron rammer. The gentleman sent the circular to the tonite agent, that he may know the unprincipled tricks practised by some of those individuals. I name this that the public may know how to treat those men. We are willing that tonite should stand or fall on its merits, and if dynamite is so much better than tonite surely they have nothing to fear; but the fact is that they are so fearful of tonite taking the lead that they are now straining every nerve to run it down. They are, however, too late, and the action taken by them is not such as will command them to any respectable person.

The tonite agents will be compelled in self-defence to lay before the public the true state of both powders, and when they see clearly the danger of both they will be able to judge for themselves whether they are not gainers by using tonite. I regret very much having to speak out so plainly, but the continued unprincipled acts of those parties compel me to do so.

FAIR PLAY.

INSTABILITY OF NITROGLYCERINE COMPOUNDS.

SIR.—I could not help observing in last week's Journal that in two letters which immediately followed each other, one disapproved and the other approved this title, as explaining the purport of Major Majendie's report, and as I regard dynamite and tonite as equally safe when in good condition and properly handled, and am pretty well acquainted with the nature and character of each, I do not see that either the representative of dynamite who wrote the first, or the representative of tonite who wrote the second, has any real ground for complaint or congratulation.

No one has ever doubted the power of dynamite, tonite, lithofracteur, Horsley's powder, or any other of the new explosives; but the contention is that with regard to all of them it has been too loudly declared that they are no more dangerous than ordinary gunpowder—a statement which everyone who has had the handling of explosives for a single month knows to be positively and indisputably false.

Major Majendie, Major Ford, and the entire staff of military officers whose duty it is to superintend or control the use of explosives, will confirm my statement that with every nitro-glycerine compound which has been brought into the market there is a considerable liability of the exudation of the nitro-glycerine. There is nothing like truth. The reason that we are not afraid to handle a razor, although it may be as keen as satire, is that we know it to be sharp, and handle it accordingly; but if we had been told that a razor was not a cutting instrument, and that the whole utility of it was to scrape off the soap that the beard might be more easily cut with scissors afterwards, the scraping operation would in all probability lead to the inconvenient division of some of the arteries of the throat, if not to the death of the badly instructed operator.

The question as between Major Majendie's report and dynamite is not, as "A Large Consumer of Dynamite" would have it appear, whether nitro-glycerine can be separated from dynamite by water, but whether Major Majendie's statement that the dynamite cartridges were lying in the exuded nitro-glycerine, "like sausages in gravy," is or is not evidence that the nitro-glycerine does sometimes exude from dynamite.

If it be admitted that it does sometimes exude (and it must be distinctly remembered that although dynamite only is spoken of, the observations apply to all nitro-compounds), it is necessary that the danger should be watched for and provided against, for it is beyond a question that the exudation of the nitro-glycerine from a single cartridge would endanger the whole magazine, since it is well known and proved that although dynamite will bear considerable concussion without exploding, a very little exuded nitro-glycerine would render easy an explosion sufficiently powerful to set off the whole of the dynamite near it by detonation. Nor is this all; for although "A Large Consumer of Dynamite" mentions the fact that a case of dynamite thrown overboard was washed to the coast of France without being injured, it is extremely doubtful whether even in a waterproof case the nitro-glycerine will not separate sufficiently for the cartridge to become dangerous.

This may account for some of the inexplicable explosions of dynamite, and we may more readily adopt that view, seeing that even with lithofracteur, which was made with a far more permanently absorbent vehicle than kieselguhr, this separation did take place in waterproof cartridge cases unless the packing was very tightly and neatly done.

We could obtain the opinion Major Majendie or Major Ford on this point it would be, I am quite sure, of great value to the whole community, and especially to miners and quarrymen, who are daily users of—

Woolwich, Nov. 28.

DYNAMITE.

ELECTRIC LIGHTING.—No. III.

IX.—WAREHOUSES, MANUFACTORIES, &c.—Buildings coming under this head can be easily and profitably lighted by electricity now that the divisibility of the focuses is an accomplished fact. No longer is the light coming from one only glaring spot on each circuit, but a great number of lights can be extracted from one and the same current.

A lamp placed at a height of 18 to 20 ft. spreads its light over an area of 18,000 to 20,000 square yards, shining like, but with greater strength than, the moon when placidly crossing a cloudless sky.

A workshop of 120 ft. by 60 ft. by 20 ft. is here lighted by one single electric lamp, whilst there a similar room employs two lamps in order that shadows should be avoided. Here four separate rooms of 38 ft. by 24 ft. by 20 ft. are brilliantly illuminated by one single apparatus with four discs, whilst six similar rooms enjoy light by the aid of a little stronger machine.

A few examples showing how the electric light has been availed of in several factories and engineering shops, in show-rooms, and in warehouses, such as at M. Menier's chocolate, sugar-house, and India-rubber manufactures of Noisiel, Royle, and Grenelle, the spinning mills of the well-known M. Souyer Querier (Rouen); M. Vrs Dieu Obry, at Daours (Somme); MM. Ricard and Sons, at Nauresta (Barcelona); Messrs. Burdette Brothers, at Sabadell (Spain); the Metal Pipes Foundry of Messrs. Nigou, Rouart, and Co., Nonthion; the Mediterranean Ironworks, Harre; M. Cal's well known works, Paris; the Pantin Engineering Works; Messrs. Crespin and Marteau's Works, Paris; Beaujolais, Milan, &c., will suffice to prove the utility of this system of lighting.

It is not necessary that these works should be shown as lighted by the most perfect system, what I want to prove is that, even with deficient apparatus, electricity as a source of light can render immense services. M. Menier—taking him first on account of the good things he produces—has 14 Gramme's apparatus in his three factories—three in his sugar-house of Royle, three in his India-rubber works of Grenelle, and eight in his chocolate manufactory of Noisiel.

In these three factories the lanterns are suspended to the ceilings, on pulleys, by means of India-rubber ropes enclosing the electric wires. These lanterns can be elevated or lowered at will, and their cleaning and supply with new carbons can be effected with very little trouble. The Noisiel factory is lighted all night, and the eight apparatus are coupled in two groups of four. By a very simple mechanism the lamps can be put out without interrupting the working of the engine or the hydraulic pump.

The tortoising room, where 44 men are employed, is 44 yards by 11 by 7½, and is lit by 10 lamps, only placed in a glass lamp on the ground at one end of the room, the light being reflected by means of a parabolic lens properly inclined to the ceiling, wherefrom it is diffused through the glass.

The moulding and weighing room, where 90 people are at work, is 5½ yards long by 11 wide, and 7½ high. Two lamps are there at work, placed 25 yards from each other, and suspended 6 yards from the ground. The repairing, constructing, and engineering shops have a superficial area of 400 yards, and are only lighted by a single focus, suspended 18 ft. from the ground. M. Menier has undoubtedly the most complete organisation as yet for lighting by electricity that can be seen anywhere, and at Noisiel he can divert the light to his private house—*to his large dining and drawing rooms, his summer and winter gardens, &c.* Lately he gave a banquet to 1450 guests, under a tent 65 by 37 by 12. The hall for the banquet and the dining room was splendidly illuminated, and a lighthouse outside, with a focus equal to 1200 gas burners, lighted the surrounding country for one-third of a mile. The same system has been followed at his other two factories.

At Royle an apparatus lights up a yard of 6000 square yards.

The spinning-mill of M. Souyer Querier, at Ille-Dien, is lighted by four apparatuses, each 600 square yards, and only 4½ yards in height, there are 22 pillars in two lines.

not be said that a newspaper can easily be read in the darkest of them. In places where daylight with difficulty penetrates, such as basements, rooms surrounded by high buildings, &c., a great advantage may be derived from what may be called a "luminous ceiling," by means of which a steady and uniform, though brilliant, light is obtained, and diffused downwards. Messrs. Ducommun and Co., of Paris, engineers, have fitted their workshops with electric apparatus, and they, like Mr. Cail, can have delicate pieces of machinery made as easily and as well as by daylight. The fousées are so disposed as to permit no shadow of any kind. Lastly, the famous show-rooms known as "Le Louvre," in Paris, are lighted by two systems—Gramme's for the basement, with a luminous ceiling, and the Nollet-Van Malderen's improved system, with the addition of "electric candles" for the show-rooms proper. Entire satisfaction is given. Sorting, measuring, choices based on colours; in fact, all the inherent details of a retail trade on a gigantic scale are there carried on with the utmost ease, which certainly could not be done by the help of the best London gas.

Old Vicarage House, Greenwich, Dec. 29.

A. VASSARD.

MANGANESE IN THE ALPS.

Sir,—Can any of your readers give me some information respecting the deposits of Manganese said to be recently discovered and worked in the Alps? If so, it would be acceptable. D.

THE GOVERNMENT GOLD MINES AT SIAM.

Sir,—Until I saw the announcement in the Journal of July 28 I understood that I was employed to carry out the duties of engineer at the Government Gold Mines in Siam. Mr. R. L. Peters, mentioned by your correspondent, is merely in charge of the stamping machinery, situated 30 miles from the mines, at which place he resides, and during the whole of his stay in this country has never been employed in any other capacity.

F. W. POOL,
Gold Mines, Siam, Sept. 29.

late of Hayle, Cornwall.

NEW QUEBRADA COMPANY.

Sir,—I think it right to send you copy of a letter I am addressing to the Secretary of the Stock Exchange with reference to a letter which appeared in your Supplement of the 24th inst.

New Broad-street, Nov. 26.

N. LEAROYD, Chairman.

[copy.]

The New Quebrada Company, New Broad-street, Nov. 26.

Sir,—The attention of the board of the New Quebrada Company (Limited) has been directed to a letter, signed "A Large Quebrada Shareholder," contained in the Supplement to the *Mining Journal* of the 21st inst., and as this letter seems evidently to have been written for speculative purposes, the directors think it right to make known the fact that its statements have no truth in them whatever.

I may point out that it is impossible for any letter written at the Quebrada Company's Mines on the 27th ult. to have been in England on the 21st inst. It is equally untrue that any such arrangement has been made as the letter of "A Large Quebrada Shareholder" and other letters in the same Journal refer to.

(Signed) N. LEAROYD, Chairman.

To the Secretary of the Stock Exchange.

NEW QUEBRADA COMPANY.

Sir,—Having regard to the very emphatic contradiction we gave on Monday last to the statements contained in the letter of "A Large Quebrada Shareholder" in your last week's Supplement it may perhaps now be our duty to say that a report dated October 31, received this morning (by French mail), brings some degree of confirmation of the statement that our exploratory works had led to the discovery of some good ore. This comes from the mines in the temporary absence of the mining superintendent, and we should not have thought it was sufficiently authoritative to justify any public announcement, but for the unqualified contradiction to which we refer. We are gratified also to learn by the same mail that the trains are now running to the mines over the whole length of the Bolivar Railway.

N. LEAROYD, Chairman.

New Broad-street, London, Nov. 29.

NEW QUEBRADA AND BOLIVAR RAILWAY COMPANIES.

Sir,—My letters upon Quebrada matters appear to have drawn upon me the wrath of the managing director, for on the 22nd inst. I had the pleasure of receiving a communication in which argument was conspicuous only by its absence, violence of language occupying its place. My correspondent apparently has adopted the tactics that a few years since he charged upon his adversaries when he wrote the numerous pamphlets entitled "Square Pegs in Round Holes," "How they Carry on the War," &c., to wit—when you have a bad case show your opponent. The effusion I refer to is marks "private," but I cannot recognise the right that my correspondent claims to abuse me privately. You see, Mr. Editor, come in for a share of the unkind remarks for your courtesy in publishing my letters, but it is not worth while to trouble you with the correspondence, for I am convinced that you would not allow your Journal to be a medium for carrying on a personal warfare. The letters are, however, at the service of any shareholder who would like to see the defence adopted by the champion of the present management.

My correspondent suggests that I have never been at the mines of Arca. This is very nice from one who has not even been in Venezuela, and he excuses the inactivity of the mines whilst the railway has been under construction by the fact that the narrow width of the ravine does not allow large quantities of ore to be stacked economically near the mine. The answer to this—the only sentence in the communication that at all bears a semblance of argument—is, that in the course of my duties as engineer and agent for 1835 to 1839, I have been at the mines, perhaps, a score of times. I do not suppose that the ravine has narrowed since then, and a very slight amount of work would have afforded convenient stacking ground for, say, two years' exportation of ore.

Let us hope that, notwithstanding any opposition on the part of the present management, the arrangement whereby the mines are to be placed under the unique direction of a well-known firm of large practical experience, will be carried out. Diplomatic and legal talk in the right place is of the greatest value, but a few grains of practical experience are, in my humble opinion, worth bushels of amateur knowledge. —Midway Chambers, Nov. 30. E. D. MATHEWS.

THE CAPE COPPER COMPANY.

Sir,—Can you in any way account for the extraordinary fall in Cape Copper shares? No doubt the price per unit of ore makes an immense difference to this company, but those interested must not forget that the average produce for 1877 will show a yield of 33 per cent. in the ore, against one of 28½ per cent. in 1876, being equivalent, at 12s. the unit, to over 2½ tons in excess, or 12,000 tons about 30,000, in money value. With diminished cost at the mines, lower freights, and the smelting operations going on, thus saving to this company the smelters' large profits, anyone at all conversant with the working details of this extraordinary property must be able at once to see that in spite of the continued depression of this metal this company is still working at about its usual average rate of profit, without at all forcing the latent capabilities of its mines, and most probably whilst largely developing its reserves in sight. Those who have sneered in your paper at the accounts of this concern should show me such another rich and well-managed property, and try and find a better investment.

A CAPE MERCHANT.

Sir,—The remarks which I forwarded to you on the 16th instant, and which you published in the Journal of the 17th, appear to have been misunderstood by Messrs. Watson Brothers, and I have to request that you will kindly allow me a small space in your next issue to point out that I do not consider those gentlemen (I referred more particularly to Mr. J. Y. Watson in my last communication) at all "too sanguine upon lead mines" at the present moment, although at the beginning of the year I was of opinion that lead mine shares were much over rated, and that any change in them that was likely to occur would be disadvantageous to the holder. My idea was so far correct, that not only have the various lead mining shares declined very materially in price, but lead itself has had a fall in market value very disastrous to those properties named, and fatal to others so far as dividends are concerned. Now that the shares in good lead companies are low, in some cases 20 to 30 per cent. lower than they were 10 months since, and now that a rise may reasonably be expected in the market price of lead if for no other reason than that it is so low, I venture to suggest that the proper time has arrived to buy, and I am further of opinion that a purchase of some of the better class of lead mines will result in very large profits within (say) the next 12 months. From the very favourable account of the D'Eresby Mountain given by Messrs. Watson Brothers, I certainly think that property may be included in such class; "a series of adit levels into a mountain" is certainly a very desirable feature to be obtained by any mining company, more particularly when the said adit levels open out courses of ore

that will produce "3 tons of lead and 4 tons of blend per fathom." I congratulate the proprietors on attaining such a valuable mine, and have no doubt that as the ore may "be quarried and trammed to the dressing-floors," and "without the expense of machinery," the profits of the undertaking will be something handsome. Messrs. Watson Brothers are also to be congratulated upon introducing the property, one of the most favourable features of which is the moderate amount of capital upon which the future dividends will have to be paid.

I shall certainly look forward with a considerable amount of interest to the introduction of the mine which Messrs. Watson Brothers mention, but I must remind them that my last letter was not in favour of tin mines any more than my previous one was in favour of lead mines. What I wished to convey by my remarks was that the slight rise lately experienced in the tin market was insufficient to warrant the great rise that had occurred in the prices of Carn Brea, Tincroft, Dolcoath, and others. I trust that on the resumption of working the tin mine alluded to, a price more favourable to the owners may be obtained for the produce, but seeing the large amount of stoning ground laid open by the large mines, which will become available as soon as a rise in tin occurs, and the increased supply such a rise will bring from abroad, it is doubtful if the prospects of an additional Cornish tin mine would be sufficiently promising to tempt—

Nov. 27.

NEW APPLICATION FOR TIN.

Sir,—I observed a few weeks since a suggestion in the *Mining Journal* that efforts should be made to secure a more extended application of tin with a view to send up prices, and I thought the idea excellent. It is useless to think of lessening the production and so on, as has been suggested in some other branches of industry, because the only result is to drive the market elsewhere; but if we can secure an increased consumption of an article, all concerned in the production must be benefited. Now, tin is a metal which has, in my opinion, been comparatively neglected during the past century, not that its qualities are unknown, or that it has fallen into disuse where it was formerly used, but there has not been the same effort made to extend its use as there has been to extend the use of copper and most other metals. Tin is used in the same way to produce pewter as it was a century ago, but the use of pewter has been to a great extent superseded by other materials, and thus the consumption of tin for that purpose has remained stationary notwithstanding the increase in population and consequent extension of industry.

For some time past much attention has been directed to phosphor-bronze for bearing metal and some other purposes; but the price—112*l.* per ton for bearing metal, and 120*l.* to 140*l.* for other alloys is exorbitant—50 per cent. higher than either of the constituent metals, and consequently the demand is limited. But the mode to obtain a large demand for tin would be to produce a good bearing metal, one that would be equal in every respect to the phosphor-bronze sold at 112*l.* (I take the quotation as given in the *Mining Journal*) at 60*l.* per ton, and this can be done without difficulty and without infringing any existing patent whatever. The alloy which offers these advantages is phosphor-tin and zinc, with for some uses a small addition of lead, antimony, and so on. And the first thing to do is to send phosphor-tin into the market at (say) 100*l.* per ton; this could be done with large profit. At the present moment the Graupen Tinworks at Marienschein in Bohemia are making phosphor-tin in large quantities, and realising excellent profits. This phosphor-tin is of great value in the manufacture of phosphor-bronze. Phosphor-tin holding more than 5 per cent. of phosphorus is not constant, but with 5 per cent. it is so to such a degree that no phosphorus is evolved by re-casting. Its melting point is 500° C.; it thus approaches that of bronze, and consequently the mixture with the copper-tin alloy is more intimate. Phosphorus removes the oxides contained in the bronze, which are prejudicial to its strength and harden it, so that only half the quantity of phosphor-tin is used compared to pure tin alone. The addition makes the bronze more fluid and adds to its power of resistance against acids. It withstands the action of sea water for a period three times greater than copper. As the various grades of phosphor-tin sold contain an unvarying percentage of phosphorus, bronze may be made with them which have a definite percentage of phosphorus.

What can be done at Marienschein can certainly be done at Chydor or Redruth, unless I am very much mistaken as to the business capabilities of Cornishmen and Cornish tinworks; and although it might not be worth while to turn attention to the phosphor-tin if its consumption for phosphor-bronze were the only demand that could be relied upon, there can be no doubt that a demand for "Phosstan-zinc bearing metal" could be created which would soon double the consumption of tin, and send up prices of tin metal and tin ores to a corresponding degree. Again, the combination of this phosphor-zinc with a certain proportion of lead produces a good tough alloy, which can be conveniently rolled to almost any thinness, and which forms an excellent sheathing metal for ships' bottoms. This alloy has many advantages over yellow metal sheathing, although it could be sold at 6*l.* per lb. and leave a good profit. It can be put on much better than yellow metal, being much more pliant and tougher, and is not only very durable, but can readily be re-manufactured when worn. I cannot understand why the Cornish smelters should not themselves undertake the manufacture of both alloys; offering the bearing metal alloy in ingots requiring only re-casting to make them ready for use, and selling the sheathing metal alloy to the owners of lead or copper rolling mills, who would have nothing more to do than roll it in the ordinary way. These are matters to which Cornishmen should at once turn their attention, unless they wish the tin trade to pass entirely out of their hands, and I shall be glad to learn, through the Journal, that some of them are prepared to profit by the suggestion.

Paris, Nov. 26.

PHOSPHOR.

THE CUSTOM OF RELINQUISHMENT.

Sir,—At the Stannaries Court on the 22nd inst., an important trial took place as to the custom of relinquishment of shares in Cost-book mining companies. It appeared that in February, 1876, certain adventurers relinquished their shares in Treleigh Wood Mine, the then purser of which was Mr. John Watson, who was also one of the relinquishers. In his capacity of purser Mr. Watson at once instructed the manager of the mine to value the machinery and materials on behalf of the company, and he also employed an independent valuer to value them on behalf of the relinquishers with view to a statement of accounts between the company and the relinquishers being at once made out. Shortly after, at the request of a shareholder holding a majority of the shares, Mr. Watson convened a special general meeting of the shareholders to take into consideration the abandonment of the mine. The meeting was held, and, instead of abandoning the mine, it was decided to continue the operations, and certain resolutions were passed amongst them, one discharging Mr. Watson from his position of purser, and appointing Mr. T. B. Laws secretary and purser in his place. Mr. Watson refused to give up the books, &c., without an indemnity, which was given him, and subsequently Mr. Laws sent Mr. Watson and his co-relinquishers a double statement of their relinquishment account, one showing their proportion of the gross liabilities of the mine, and immediate payment of which was demanded, and another statement giving the value of the machinery, &c., and each relinquisher's proportion thereof, which would be paid them at the expiration of two years. The relinquishers disputed these accounts—first, because the value put upon the machinery was about 300*l.* less than the valuation made by the manager of the mine, and by the independent valuer employed by the relinquishers; and secondly, because the account was not made out according to the custom in such cases, whereby a shareholder relinquishing his shares is entitled to have the value of the machinery, &c., placed as an immediate set-off against the liabilities, and to be liable to his share of the balance only. Mr. Laws, who was principal witness on behalf of the plaintiffs, admitted in cross-examination that the valuation of the machinery disputed by the defendants was not made by order of either the committee or the company, but on his own

account. The defendants refused to pay what was demanded of them, and they were immediately served with writs of action in the Court of Exchequer.

The proceedings in that Court were subsequently abandoned by the plaintiffs, they apparently having ascertained that an existing partner cannot sue a retired partner upon a disputed account. Proceedings were then commenced in the Stannaries Court, the plaintiffs gave notice of trial for the May sittings of this year, and then countermanded it; they also gave notice of trial for last August sittings, and this also was countermanded. On the 22nd inst. the long-delayed trial took place before the Vice-Warden and a jury. The issue to be tried was the custom as to relinquishments of shares in Cost-book companies. The plaintiffs contended that the custom is that a retiring shareholder is bound to pay at once his proportion of the gross liabilities of the mine, and at the end of two years he would be entitled to receive his share of the assets of the company. The defendants contended that a retiring shareholder is entitled to the value of the machinery as an immediate set-off against the liabilities, and can only be called upon to pay his proportion of the balance.

To make the matter clear, let us suppose A relinquishes shares in a mine, the liabilities of which are 100*l.*, and the machinery is worth 50*l.* The plaintiffs contend the custom is for A to pay immediately his proportion of the 100*l.* liabilities, and at the end of two years to receive his share of the 50*l.* assets. The defendants contend that the custom is to deduct at once the 50*l.* assets from the 100*l.* liabilities, and for A to pay his proportion of the balance. Witnesses were heard on both sides, and the jury gave a unanimous verdict for the defendants. It was observed in the course of the trial that if a shareholder is to be allowed to claim his share of the machinery, &c., at once, all the shareholders but one might retire, and the whole of the concern be thrown upon the shoulders of one man. But in the majority of relinquishments the balance is against the relinquisher, and he does not take his share of the assets in cash, but in account, and if he were compelled to pay at once his share of the debts in cash and to wait two years for his share of the assets, before the expiration of the two years the remaining shareholders might have become insolvent, the machinery insufficient to meet merchants' claims, and the retiring shareholder would lose all his money. It would be manifestly unfair that a relinquisher should be subject to this risk after having discharged his proportion of the gross liabilities of the mine.

One of the witnesses for the defence stated that he was in possession of papers showing that the custom contended for by the defendant was that adopted 50 years ago, and it is unquestionably the custom that has been generally adopted, and the evidence for the defence was overwhelming upon the point. That custom, which is now established beyond all doubt, is the fairest and simplest that could be adopted. The right of a shareholder in a Cost-book mine to retire from the adventure at any time has always been looked upon as one of the advantages of the Cost-book System; it is really the bulwark of the adventurers' self-protection, and the exercise of such right should be settled as simply and speedily as possible, but if the principle contended for by the plaintiffs in the present action were admitted there would no longer be either security or protection for a retired shareholder. Instead of being free from all costs and anxieties beyond his fair proportion of liabilities up to the date of his retirement, that retirement might be but the commencement of his expenses and troubles. The remaining shareholders, if wealthy and litigious, might make an unfair demand upon him, and if he disputed they could give notice of action, and countermand them (as was done in the present case) for an almost unlimited period, and nearly ruin a person of limited means by legal expenses.

MINER.

COST-BOOK SYSTEM—TRELEIGH WOOD.

Sir,—A case of vital importance to the mining community was heard on Thursday, the 22nd instant, before the Vice-Warden, at the Stannaries Court, Truro, and as one of the parties interested in the case beg your insertion of a *resumé* of the whole question at issue. Unhappily for me I was unable to follow the evidence given *pro* and *con*, in consequence of defective hearing, but I have been supplied by notes which were taken for me by a gentleman engaged in the case, and will, therefore, endeavour to give as correct an account of the proceedings as I can.

The above mine commenced to work in 1871 under the Cost-Book System, and without rules and regulations, consequently the affairs of the company were carried on under the existing Stannaries Act, and the procedure of the Stannaries Court. The mine originally was in 1000 shares, but in 1872 were sub-divided into 5000, and in February, 1876, 4958 shares were held by about 30 shareholders, one of whom was the possessor of more than half of the concern. At a meeting of the shareholders, held in the early part of this month (February), the principal shareholder intimated, prior to the meeting, that he should propose a call sufficient to meet the liabilities of the mine, which were set down in the accounts at 2900*l.* This idea not being quite in accordance with the views of other of the largest holders they at once relinquished their interest in the mine, claiming their share of the assets of the company, and this proceeding was followed almost immediately by about 10 of the remaining shareholders. The relinquishments of the four defendants in this case having been entered in the cost-book before the meeting was held, there was no alternative but to accept them, and the proposed call having been made the meeting was adjourned, and a special meeting called to consider the question of winding up the concern. At the adjourned meeting a change of management took place, and at the special meeting it was determined to continue operations. In due time I as the secretary of the company prepared a statement of accounts, showing each relinquishing shareholder's liability made up to the end of the working month in which such relinquishment was put in, at the same time crediting each shareholder with his share of assets, as appeared in the accounts presented to the meeting, and as far as could be ascertained, and claiming the balance from each adventurer as his liability to be paid forthwith. Irrespective of this statement it became necessary to ascertain the relinquishing shareholders' share of the plant, machinery, material, &c., was, and a mine agent qualified to judge as to the value of the plant was called in on behalf of the company to value as an abandoned concern. In the mean time it appeared that the relinquishing shareholders had also had a valuation made of the machinery, &c., which I was informed was much in excess of our value, and I, therefore, as the purser of the mine called in a third party to give me his valuation. This latter was somewhere between the two, and it was, therefore, decided to accept this valuation, and a statement was prepared showing what the company would be indebted to the relinquishing shareholders, and which we believed to be due, but not payable, to the retiring shareholders for two years. The defendants required that we should accept the valuation made by their agent, and that it should be set off against the statement of liabilities furnished to them, with alterations, which were, with the set-off, objected to, and legal proceedings were commenced to recover the amount of the liability from each respective relinquishing adventurer. In consequence of unforeseen circumstances the action was delayed till last Thursday, when the trial came off before the Vice-Warden and a jury. On the other side it was argued that the custom of the county was to allow a shareholder his share of the plant as a set-off against his liability, but this custom was disputed, and the real question to be decided was whether a relinquishing shareholder should pay his proportion of the liabilities of the mine to the end of the month in which he relinquished his shares forthwith, and wait two years for his share of the assets, or whether he was entitled to set off his share of the assets against his liability, and pay his proportion if the latter were in excess, or receive the difference, if any, at once.

It was also necessary that the Court should say whether a shareholder was entitled to a valuation of the plant as a going or knocked concern, but there was so little doubt on the question that it was virtually settled at the commencement of the trial by defendant's solicitor admitting that the valuation must be an abandoned concern. There are many arguments may be raised on the whole

question, but I confine myself to the facts of the case, and make no comment whatever that may be considered as questioning the decision of the Vice-Warden, which no doubt is, in the absence of any law on the subject, fair, and in accordance with established usage.

In the opening of the case our solicitor intimated that he did not think the question was one for a jury, but a point of law which should have been argued before and decided by the Vice-Warden. This was waived, and the address to the jury resumed. It would be needless to recapitulate all that passed, as the above shows the cause of the action. The first witness was myself, and my examination merely brought out what I had done in my duties as purser to the mine, but on cross-examination it was elicited that I had relinquished shares in other mines, and objected to low valuation, and that I had not refused to receive a statement of account showing the balance against me after allowing my share of assets. I was at one time under the impression that a relinquishing shareholder was entitled to his share of assets as a going concern when the mine continued to work, but with regard to refusing a statement of account if a purser had the courtesy to make me the allowance, perhaps I might have been unwise not to accept, for it would be evidently more to my taste to pay a small sum as a balance than a full liability, and wait two years for my share of the assets.

Evidence was produced for the plaintiffs to show that the payment of liabilities prompt was not unknown, and that two years was the allotted time for payment of assets. The evidence for the defendants consisted of the opinions of a goodly array of persons and others who had had much experience in mining matters, who proved the contention that it was the custom to allow a relinquishing shareholder his value of the plant, &c., as a set-off against his portion of the liabilities.

The summing-up of the Vice-Warden was a careful survey of the whole of the evidence, and the question left to the jury was whether it was the custom or otherwise to set off the value of the plant against the liability, and their verdict was in the affirmative; but with regard to the matter of payment and receipt by the defendants, it is left to the Registrar to settle an account as between the relinquishing shareholders and the company, to be completed this sitting. Without referring to the result, there is no doubt that a vexed question has been finally settled—at any rate, until the law steps in and rules otherwise. It is well to mention that in many Cost-book mining companies the affairs are conducted under rules and regulations, one of which is to the effect that a shareholder can relinquish his shares on payment of his liability to the end of the month in which he relinquishes his shares, and at the same time giving up his share of the machinery, material, moneys, and all other the property of the adventurers. In any case where rules are adopted it is as well to have them printed in *extenso* on the back of the certificate of registration of the shares, although where the rules are registered in the Stannaries Court, in accordance with the clause in the Stannaries Act, 1869, it would probably be sufficient for a purser to prove a shareholder's position should the question arise.

T. B. LAWS.

London, Nov. 26.

INDUSTRY IS WEALTH.

SIR.—Industry and wealth are the two mainsprings of national as well as individual prosperity and progress. Capital is not adverse or inimical to labour; lock-outs and strikes are opposed to industry and wealth, for the cessation of toil immediately lessens wealth and deteriorates the standard and value of both. It is industrial energy that has built the princely and ducal mansions of the land—the cities, towns, boroughs, villages, and hamlets that abound throughout Great Britain all spring from industry, supported by accumulated wealth. Strikes and lock-outs have in no way contributed to their growth; but, on the contrary, crippled the active expansion of muscular power, and substituted in its stead dissatisfaction, distrust, and wide-spread commercial and social want and desolation. Again, it is industrial energy and not strikes and lock-outs that has made the mining districts the valuable possessions they are, or rather were, for the wide-spread misery and want of employment so bitterly complained of in the North of England, the Midland Counties, the Forest of Dean, and in South Wales, are wholly attributable to the deplorable mechanism of Unions and the sad influences of demagogues in perverting and controlling the actions of the labouring masses; and, lastly, it is industrial energy that fosters and augments the agriculture of the country, and gives increased value to its products. In promoting the volume and worth of manufacture, merchandise, and enterprise, all honest, honourable, and legitimate industries are alike advantaged. Hence we should support and foster industrial energy, and disown and condemn all unions of terrorisms on the parts of both masters and men—doom the exacting and misguiding pedagogues to derision and obscurity, while we frustrate all attempts to limit the out-put or volume of labour, or to equalise the wages of workmen. There are good and bad in every family and in every community, but to be compelled to pay the latter the price of the former is to fly in the face of progress and to encourage the seeds of degeneracy in each and every branch of our widely extended and varied industries.

Leaving agriculture out of the question for the present, pray let us refer somewhat in detail to the great and manifold advantages of mining when considered as a source of national wealth.

It is no exaggeration to say that mining is the keystone on which is founded and erected all those varied and extended trades and occupations that have been promoted and carried on so successfully by the industrial energies of the working community. The miner explores the earth in search of the hidden stores of minerals and ores, which when happily discovered not only enriches himself, but also infuses life and vitality into others who enter the arena of action in hopes of similar successes.

These chambers of wealth not only stimulate industry in the hard-working miner, but also enlists the greed of capitalists. Hence whenever these "cycles" of prosperity transpire, as in the cases of Great Laxey, Isle of Man; Minera, in Denbighshire; Van, in Montgomeryshire; Devon Great Consols, Buller, Alfred Consols, East Caradon, or South Caradon, Phoenix, Fowey Consols, Par Consols, Lanescot in the South West Peninsular, there has immediately sprung up an active epoch of mining adventure; while it is chiefly attributable to these periods of inflated expectation—the ultimate discovery of vast fields of mineral wealth occur—that constitute the backbone of England's material and social prosperity. So vital and indispensable are coals, iron, and other metals, minerals, and earths to the well-being of the human family, that one must draw deeply on the imagination even to picture a series of concurrent circumstances through which a stop be put on our products of these indispensable requisites, the absence of which could not otherwise than effect a total retrogression into semi-barbarism of this highly cultivated, richly endowed, and at present prosperous country. In our opinion mining pursuits is a form of industry inevitably destined to grow in favour, adoption, magnitude, and usefulness as years roll on, and experience and intelligence supplant the prejudices and ignorances so prevalent throughout this branch of our important home industries. The mineral and metallic deposits in this country, and throughout the whole globe, are so vast and generally distributed that it is a matter of utter impossibility to calculate even approximately their extent, value, or character. It is no less important and momentous to the Mother Country than to our colonies that minerals and metallic ores be found in abundance and these, accompanied by fertile soils, which are the primary source of abundant harvests will unquestionably form the nucleus of the future wealth and greatness of her Majesty's colonial dependencies—i.e., India, Cope, Australia, New Zealand, Canada, with innumerable other countries.

That Providence has not intended all her hidden stores to be brought to light at any one given time, or by any one given adventurer, is manifest in every mining district, and throughout all ages, but probably it is exemplified more clearly in the case of Wheal Basset Mine, in Cornwall, than generally becomes evident in the career of one property, and within the scope of personal observation, and transpiring within the compass of the last quarter of a century. The first riches were discovered in the southern parts of the company's concession, and at about the year 1833-4 considerable profits were divided. In course of time the ores became

comparatively exhausted, and others found to exist on parallel ledges to the north. The issue was the division of the sett into two companies—South Basset, that required calls, and Wheal Basset, which yielded dividends.

This was not the only metamorphosis, for Buller and East Basset were abandoned by Wheal Basset in order to keep up the dividends, and rather than incur the necessary outlay of development, Buller, however, upon an outlay of 1200*l.*—say, 5*l.* per 25*th* share—rose in commercial value to 1000*l.* a share, and declared in dividends about 300,000*l.* East Basset shares also advanced to 220*l.* per 51*th* share, and the riches were laid open upon a comparatively small outlay; whilst again Copper Hill was abandoned by Buller, and constituted a separate company, the shares ruling at one time 180*l.* each. It will be seen that although Wheal Basset was the sole proprietor of this group of mines, Providence in dispensing with her hidden stores had decreed that they should be brought to light at different cycles, and by distinct members of the Commonwealth, in order that the wants of mankind should be supplied not only during the period referred to, but in similar manner and under varied circumstances throughout all ages. In the face of all these changes it must not be lost sight of that Wheal Basset is still at work, although no dividends have been declared since 1872. The aggregate dividends have been 638*l.* 10*s.*, or 5*l.* 2*s.* 6*d.* paid on each 51*th* share.

In conclusion, and referring to a few home metal mines, we may mention without fear of contradiction that, with the exception of Great Laxey, Van, Grogwinion, and South Condurrow, most of the old familiar dividend mines are justly out of favour, as, for instance, Devon Great Consols, Roman Gravels, Tankerville, Dyliffe, Phoenix, South Caradon, Owles, Botallack, Herodsfoot, Bassett, South Frances. There are on the other hand many promising and encouraging ones upon the tapis, likely soon to prove highly valuable and profitable—as for instance, Pateley Bridge, Cambrian, Temple, Tyn-y-Fron, Mellanear, D'Eresby Mountain, Lovell, Ladywell, Hulafall, and Glenroy. Again, Dolcoath, Tincroft, South Crofty, South Frances, East Pool, Phoenix, Bottallack, and other tin mines only require an advance of metal up to 50*l.* per ton to pay shareholders substantial dividends. The discovery and substantial dividend of Eliza Consols mark a new cycle of mining in the St. Austell district, and it is rumoured that another important property is to be vigorously worked in the very centre of Fowey Consols, Lanescot, and Par Consols, called West Fowey and North Lanescot. This company's concession cannot fail to prove rich in both copper and tin.

Exchange, 66, Coleman-street, Nov. 28.

R. TREDDINICK.
Dealer in Stocks and Shares.

REPORTED VALUABLE DISCOVERY IN WALES.

SIR.—In my route from Welshpool to Birmingham, *via* Builth, I had to stop a day at Llanidloes, and in mixing with several mining men there I found that the all-absorbing topic of the day was not the crisis in France, the Trial of the Detectives, or the Russo-Turkish War, but the extraordinary discovery of a fine masterly lode containing an almost unheard of quantity of lead or silver-lead ore up close to surface for nearly 200 fathoms in length. Having to stop a few hours at Rhayader, I found the people there all "up in arms" about it, and they could tell me it was all true. Now, Sir, can any of your correspondents inform me, through the Journal, as to its exact situation from Rhayader, extent of sett, nature and extent of the discovery, the lessors or owners of the property and their address? I know several parties in London, friends of mine, who with myself will readily go heartily into the thing if there is a chance. —Builth, Nov. 19.

H. P. WILLIAMS.

THE DISCOVERY OF SILVER-LEAD IN WALES.

SIR.—Possibly you are not aware that a grand discovery of silver-lead ore has been made in this locality, but, be this as it may, a greater providential blessing could not possibly have happened to this place at such a crisis, as the times and business are fearfully bad, but now great rejoicing and excitement prevail. But, in order to test the grounds for such excitement I had to proceed in the matter very cautiously, inasmuch as, as no doubt you are aware, every precaution is generally taken "in such extraordinary discoveries" against the inconveniences and annoyances caused by an influx of visitors. I, however, succeeded at last in getting a view of the lode, and I assure you, Sir, I thought myself highly privileged to see once in my lifetime, and in open day, the grandest sight of lead and silver-lead ore which I may venture to say was ever before seen at surface in the country. Indeed, it would be vain on my part to attempt anything like a full description of its appearance and value. Sufficient, therefore, to say that I saw it in several open cuttings for upwards of 150 fms. in length, and in which the lode is 18 to 20 ft. wide, containing veins of what is evidently almost pure silver-lead ore, varying in width from 4 to 6, 9, and 14*l.* wide, while in one of the cuttings one of these veins is even 2*l.* to 3 ft. wide, and which I was told also contains a good percentage of blonde ore; this I presume is an excellent feature for the production of silver-lead ore in depth.

I believe the grant or sett to be a very extensive one, being not less than 1*l* mile on the course of this grand discovery, which I am also told is to be seen for its entire length, which will be combined with an ample and never-failing supply of water-power to put the mine to almost any depth, also for all other purposes, besides the advantages of driving adit levels. You will therefore, I believe, Sir, agree with me that the proprietor has every reason to consider themselves most fortunate in possessing such a very valuable property, and that the people in the neighbourhood might well rejoice with great excitement over such a wonderful discovery; while, on the other hand, I am confident you will see the importance of granting space and publicity to such valuable information for the mining community at large by kindly allowing its insertion in this week's issue of the Journal. Rhayader, Nov. 29.

A. EVANS (a Resident in the Neighbourhood).

SLATE QUARRYING IN CARDIGANSHIRE.

SIR.—I notice in the Journal that there is some disposition to endeavour to open quarries in this county. A very foolish prejudice exists against quarries paying south of the Dovey River, or south of the Merioneth; but there is no reason whatever why it should be so unless, indeed, as an extraordinary coincidence, there is a change in the stratum of ground, between the north bank of the river and the south. But this is not the case, as I am informed by very competent men that there is as good a trap rock to be seen in places as could be wished for the production of slate. The only quarry at present in work is the Dynlin, where, although but little has been laid open, there are two at least good veins to be seen, one for slabs and the other for slates. The proprietors (and I may say I am not one) are now erecting machinery for the production of marketable slabs and slates; and from all appearances this quarry will, with judicious outlay, become a paying concern. Already there are other places in this country being tried for slates, and it is to be hoped that the public will not listen to the foolish statement of bigoted people that "there are no slates in Cardiganshire," but will, at all events, endeavour to find out for themselves. —Aberystwith, Nov. 26.

X. X. X.

PARYS MOUNTAIN MINE.

SIR.—The present time is a very important one in the history of this mine, for the Mona lodes in the open-cast may be cut at any hour. This prior to the striking of the mass of copper ores, 35 fms. above, from which 5,000,000*l.* profit was extracted. A great question crops up at this time, which subject has not lately been mentioned by the manager—Capt. Mitchell. Does the claret or black coloured stream so full of copper continue to flow? If so, then no question but that the mass of ore does hold good below. Parys Mountain is frequently spoken of as the finest investment on the market. The reports are now looked for with much interest by holders.

NEMISIS.

LLANRWST LEAD MINE.

SIR.—Like "A Shareholder" who addressed you last week, I also have received a circular from a certain "firm," who state that a dividend will be paid by this mine next month, and on the faith of such statement strongly recommended the shares to me at 4*l.* 5*s.* each—a premium of 11*l* per cent. If the mine were one of the most successful on the market it could not be more extolled or more fervently recommended. But what are the actual facts? Llanrwst after an existence of four years, and an expenditure of about 15,000*l.*—exclusive, of course, of the purchase money, 45,000*l.*—has sold 50 tons of lead ore for 61*l*. 10*s.* This sale of 50 tons has been announced far and wide as though it were a wonderful achievement. Probably some of the shareholders will be rather surprised to learn that 40 tons were stated to be at surface when the present company came into possession, and were duly included in the purchase, so that for all these years of work a sale of 10 tons net represents the entire success of the Llanrwst Mine; and upon the faith of this insignificant result, and a probable sale of 70 tons next month—the aggregate representing less than 1000*l.* in money against an ex-

penditure of fifteen times that amount—a dividend is to be declared. Truly, as the firm reiterates who have so kindly sent me their circular—*the mine is a second Van!*

Nov. 27.

WEST PATELEY BRIDGE LEAD MINES.

SIR.—I am instructed to inform you that on the 19th and 20th inst. the Chairman visited the mines, which are opening out in the most satisfactory and encouraging manner. Great progress has been made in development, and in the construction of the necessary works; a water-wheel, crusher, jigger, grating, and dressing-floors have been erected. Iron rails are on the ground for laying the tramways. A Robey's patent drawing-engine has been purchased on or December, when the sinking of No. 2 shaft from the 20 to the 30 will be immediately commenced. The first parcel of lead will be smelted in December, from which date smelting will proceed regularly.—Gresham House, Nov. 29.

J. JAMIESON TRURAN, Sec.

TREBEIGH CONSOLS MINE.

SIR.—I regret that I should have put myself to the trouble of writing on this subject, since while entirely misunderstood only resulted in a communication of such unprovoked and offensive dis-courtesy as that of your correspondent's letter in last week's Journal. My letter was perfectly inoffensive, blamed no one, and was written equally in the interest of all concerned as myself. I never dreamed of proposing that shares should be offered at 10*s.*, under the present circumstances of the mine, but only on the supposition that it was changed to limited liability, in which case, with the arrears of call paid up, and a large additional amount of capital, shares would assume a greatly increased value, while inflicting no more costs on the present holders who have paid up all his calls, as your correspondent would seem to have done, that would have been most gratified with a suggestion which, if carried out, would have given his shares a real market value, and which, if he had taken pains to enquire, would have necessitated the previous paying up of their calls by all those now in arrears. I repeat that with an excellent set, the mine already partially proved, plant provided, arrears of call paid up, and 4000*l.* (say) additional capital in 10*s.* shares, the public would, no doubt, readily give this price for so good a speculation, on the limited liability plan.

SHAREHOLDER.

OLD TREBURGETT MINE.

SIR.—Seeing a letter in last week's Journal signed "Miners of St. Teath" permit me to state, knowing as well as I do, both the manager and the mine, that there must be some mistake. I am satisfied the manager of the mine, who understands his work, and is competent to manage this or any other sett in the district (which promises to prove one of the richest in Cornwall for lead), would never have dreamed of refusing such an offer as to work the mine gratuitously. Say, rather, and which I know to be the case, that the mine requires to have a large sum spent on it for further development in order to render it a dividend-paying concern, and that sum not being available.

London, Nov. 20.

ONE WHO KNOWS THE DISTRICT.

THE OLD TREBURGETT SILVER-LEAD MINE.

SIR.—As one of the original shareholders in this undertaking I was pleased to see in last week's Journal a letter relative to this mine signed "The Miners of Old Treburgett," although I must frankly say that I disagree with them, for the reasons which I will enumerate by-and-by.

As the origination of this company may not be known to some of your readers I would venture to state that a few years since the mine, which had been abandoned some 30 years previously, was started with a capital of about 30,000*l.*, which, if spent on the mine, instead of a large and unreasonable portion going into the pockets of the promoters, would, in the opinion of competent authorities, have opened out a profitable and lasting undertaking, and prevented the present *contretemps*. When the flattering and highly-coloured prospectus was issued pointing out the splendid prospects of the concern, I, like many others, was unfortunately induced to invest some of my savings. As soon as the mine was forked (by the way a most tedious and expensive affair) it was found, as might have been expected, that the old workers had taken away all the mineral they possibly could. The present company had, therefore, to open out fresh ground, which they accordingly did, and succeeded in making some valuable discoveries and returns of rich silver-lead, but not sufficient to enable dividends to be declared. Further, explorations had to be carried on, but in consequence of the lack of cash, owing to the unreasonable amount paid out of the capital for promotion money, coupled with the 1-10th dish, this has been very sparingly done for the last two or three years. The recent loss of about 1600*l.*, owing to the failure of a smelting firm, has brought matters to a crisis, and produced a partial suspension of the mine. The lord has taken possession, and the former shareholders may now, I suppose, consider their interest in the concern as nil. Briefly, there are two causes which have brought about this unfortunate state of affairs. The large proportion of the capital having been swallowed up in promotion-money, and the excessive rate of dues. The only persons who have been benefited, with the exception of the employees, are the promoters and the lords.

And now as to the present prospects of the mine. I am quite satisfied that it is still a good speculation, but I am assured from practical miners well acquainted with the ramifications of the undertaking, and who are disinterested parties, that the mine cannot be brought into a paying state until a considerable sum of money—say, from 5000*l.* to 8000*l.*—has been expended in carrying out exploratory operations in virgin ground, making fresh discoveries, and opening out the present lodes. The offer of "The Miners of Old Treburgett" (who I think must be really a very small portion of them) to work the mine on their own responsibility for 12 months, would, I feel assured result in the suspension of exploratory operations, the mineral which is at present in sight being dug out in the course of a few weeks, and the abandonment of the mine. It is my wish, for the sake of the miners themselves, that Old Treburgett should be vigorously prosecuted, as I believe it is well worthy the attention of mining capitalists. I would urge most strongly, however, that a liberal rate of dues should be granted, which I hear is in contemplation.

In conclusion, I cannot but express my approval of the confidence reposed by the company in the efficient and able manager (who is one of the best practical lead miners), as I believe that had it not been for the energy, perseverance, and skill which he has displayed in the face of the great difficulties he has had to contend with in carrying on the operations of the mine it would have collapsed long since.

AN OLD SHAREHOLDER.

ROADWAYS AND FOOTPATHS.

SIR.—I read in the Journal lately a communication from Dr. Nolan, who has attained some celebrity for his knowledge of mining, metals, mineralogy, and geology, but who, I am given to understand, is not an engineer. A man cannot be everything, and I question some of the learned Doctor's opinions about roads. I will admit that neither the asphalt nor wood pavements have answered expectations, but the Doctor admits that they are noiseless as compared with granite, and I have seen horses slip as commonly on stone pavement as frequently as on either of the others. If the new cohesive be as clean, durable, unslippery, and safe a substitute the Doctor should give us some further particulars, especially as to the economy of this unknown and untried substance. The readers of the Journal will give anything, the Doctor says, a very favourable hearing, especially as coming from the *Mining Journal*, but the allegation of facts made by Dr. Nolan are not sufficiently detailed to convince everybody. He knows he will have a respectful hearing from the constituents of the Journal. I submit that the information given is insufficient, but what is afforded by your correspondent is so well expressed that it is taking to the eye; I want to be convinced.

Milton Lodge, Bedford Park, Chiswick, Nov. 20. M. YOUNG.

Meetings of Public Companies.

SCOTTISH AUSTRALIAN MINING COMPANY.

The half-yearly meeting of the shareholders was held on Friday, Nov. 23, at the Cannon-street Hotel.

Mr. ADOLPHUS W. YOUNG, M.P., in the chair.

Mr. GRAINGER (the secretary) read the notice convening the meeting. The report, which has already appeared in the Journal, was taken as read.

The CHAIRMAN said that the meeting was held a little later this year than last, and the reason for that was that Mr. Morehead, after his return to the colony from his visit to this country, had considered it desirable to pay visits of inspection to the colliery and the two copper properties, and this caused a little delay in the forwarding of the balance-sheet. The principal source of the company's income continued to be the Lambton Colliery. Although there had been a continuance of low prices for coal in this country, and freights to eastern markets had also ruled very low, and English coal had, therefore, taken the greater part of the trade to those markets, the colonial trade had been doing fairly well. There were now ten collieries at work, against nine at this time last year. This company had done a fair share of the trade, and the result of the half-year's work compared very favourably with that of the corresponding period of 1876. In the half-year now current the company's business had been pretty good—in July, 11,434 tons; August, 13,723 tons. The September sales had not yet been advised. Costs were kept down by the colliery viewer as much as it was possible to do, considering the very high price paid for miners' and other workmen's wages, but whilst this was done the future was not lost sight of, and headings were kept driven in advance by which a very large quantity of coal was won or made available to be taken out. A computation had been made that the coal in their present seam would last nearly 50 years at the present rate of extraction; of course, there were other seams below this one. They would see, therefore, that their colliery was in a sound condition. (Hear, hear.) Of the copper properties with which they were dealing he could not give quite so flourishing an account. The copper property near Rockhampton, in Queensland, showed great indications of mineral wealth at the surface when the company purchased it, there being several lodes cropping out. A considerable extent of shallow workings had been executed by means of horse and hand power—1676 tons of ore had been raised, and 131 tons of copper made; 4½ tons were sold in Sydney at 65/- a ton net, and 126½ tons shipped to London. About 160 tons of ore remained to be smelted; this was irrespective of copper in the furnace bottoms. Thus the promise of productiveness in the surface workings had been fairly borne out; the ore averaged by assay 11 per cent.; some of it had been of very high percentage, as much as 31 per cent., but the average was about 11 per cent. The point that had to be proved now, having got a pretty accurate knowledge of the surface, was the value of the lodes in depth. The deepest point at present was only 144 ft. in what was called the Big Blow shaft; the lode there which had become less productive a little above that depth was beginning to make ore again and to promise to again become more productive. It was a common thing for lodes to fluctuate in this way, and there was every reason to believe that deeper sinking at this and other points would result in proving the existence of paying deposits of ore in permanence. This, however, from the usual impediment of water, could not be done without pumping and hauling machinery, which up to the present time had not been needed, as there was comparatively little water to contend with in the shallow workings. The matter, therefore, which the directors had to decide was whether they would provide this machinery and test the property in depth. At present the costs at the mine had been reduced to a very moderate monthly expenditure. The position of matters at their other property (Cadin), as regards the present productiveness of the lodes and the likelihood of their making up in depth, was much the same as that of the Queensland property, except that in the case of Cadin the mine was more fully developed, and was being worked at more places, yielding small quantities of ore, though not of a high percentage. A favourable feature was that the workings were connected with an adit which was being driven into the hill, and if this should lead to a discovery of ore the mining captain anticipated that a large mine would thereby be developed, and could be worked very economically. Here, too, depth must be attained; at present the greatest depth reached was 40 fms. There is good machinery, with furnaces and all other necessary appliances in the property; some jiggling and dressing machinery of the most approved construction had been sent from England and erected, and it was expected that this would enable the mine manager to deal probably with the lower class of ores got from this mine. The quantity of ore raised here was 680 tons, of an average quality a little under 10 per cent. by assay. About 21 tons of copper had been sold at Sydney, made from some of this ore, at an average net price of 68/- 10s. per ton, which he understood from my co-director, Mr. Elder, who had a great deal to do with copper, was a fairly good result in the present condition of the copper market. The result of the recent crushing of stone from the gold reef at Cadin had not answered expectations so far—100 tons of stone were crushed, and gave but a small yield; this, of course, proved no more than that the point from which this stone was taken either the reef did not contain gold in paying quantity, or that the method of extraction used had failed to get out the whole of the metal. To both these points the attention of the manager and mining captain have been directed. Considering that the reef had yielded in previous trials as much as 1 oz. of gold to the ton, it was reasonable to assume that it contained paying quantities in parts which had yet to be discovered and tested. Excavation at this mine also was being restricted within moderate limits. These two copper properties, irrespective of their mineral character, consisted of over 4000 acres of freehold land, which, with all the buildings, machinery, and plant upon them, must be worth under any circumstances a pretty good sum of money. He was not of a sanguine temperament, and liked to let the shareholders know the best and the worst of things, and if these properties should ultimately not become good mines, and some money should be lost over them, they would all feel it to be a satisfaction that the facts had been plainly stated. Further, they had in their other properties a considerable amount of value over their cost, which would far outbalance any loss likely to be sustained by the copper properties. Whilst he thus spoke plainly he would not have them understand that there were not fair prospects of the copper properties improving. He then moved that the report of the directors be received and adopted, and that the dividend proposed therein, at the rate of 15 per cent. per annum upon the paid-up capital of the company (140,000£), be confirmed, the same to be payable, free of income tax, on and after Friday, Dec. 4.

Alderman Sir CHARLES WHEATHAM seconded the motion.

Mr. HILL stated that the amount expended on the copper properties was rather surprised him; he thought it was more than had been contemplated when operations upon them were sanctioned.

Mr. BOLTON considered the dividend of 15 per cent. a small one in the balance shown by the profit and loss account, and that £10,000 was a large sum to carry to reserve. He gave the result of a study of the company's accounts for the last ten years, and thought the capital account should be closed and every item in the balance sheet that was not producing returns should be extinguished, and its amount added on to the Lambton Colliery.

Mr. RATT, as one of the auditors, did not agree with the last speaker. He thought the accounts were very well kept and properly stated. Everybody knew that the present time was not one in which copper properties could become very profitable, but the copper market would improve. Of course, he expected that a call would be required on the company's new shares, and he supposed it would be soon made; he would prefer that to the company's borrowing money.

Mr. FREWELL doubted whether it was judicious for the company to refine the copper it made.

The Rev. A. Y. BAZETT thought the accounts told their own tale in a very plain and straightforward manner to ordinary readers, and though he, of course, yielded to the superior knowledge of Mr. Bolton on such matters, he preferred to trust to the general business capacity

and honour of their directors in the general management of the company's affairs.

The CHAIRMAN, in replying to the remarks of the speakers, stated that the directors were keeping a careful eye upon the expenditure at the copper properties, and he was glad to have had the opportunity of getting the views of the shareholders on the company's various interests. A call of 5s. per share would probably be made on the new shares at an early date.

The resolution for the adoption of the report was then put and carried unanimously, the auditors' remuneration was voted, and on the motion of Mr. Bolton a cordial vote of thanks to the Chairman and directors was carried unanimously.

CHONTALES CONSOLIDATED MINING COMPANY.

The seventh ordinary general meeting of shareholders was held at the offices of the company, Gresham House, on Thursday.—The Right Hon. the Earl NELSON, Chairman of the company, presiding. Mr. J. JAMESON TRURAN (the secretary) read the notice convening the meeting, and the report of the directors was taken as read.

The CHAIRMAN, having apologised for his absence from the previous meeting on account of domestic affliction, proceeded to formally move the adoption of the report and accounts. After what had happened in this company in past times he was very loth to be over sanguine, because they might all of them say that whenever they had had a new manager they had always had a sanguine statement, and that it had always then been said, "We are going to turn the corner." All he could say about this was that it appeared at present that two things were combined, and he certainly thought it looked well for the company that those two things were combined. In Mr. Belt's reign the fact was pretty nearly established that the proper average return from the ore from all the mines was 6 dwts. per ton, but they had never attained to that success since Mr. Belt left. They got returns of 4½, 5, 4, 5, 3½, 3, 4, 4, and 4½ dwts. per ton shortly after Mr. Belt left, and in 1877 the returns were 3½, 2½, 2½, 4½ dwts. per ton, and then happily, and mysteriously perhaps, the moment the new manager was appointed the returns immediately jumped up the first month from 4½ to 5 dwts. per ton, and the next month to 6 dwts. per ton, which was the original average of Mr. Belt. Now, he thought that was satisfactory as to the future. The directors learned from their new manager that this increased return was obtained without any alteration in the reduction works, or treating the ores in any different way from what had been done before, and also without any alteration in the character of the ores, which had been fairly taken, partly from a mine which had been before in full working order—the San Sebastian—and the other part was taken from the heap of ore which they had heard of so frequently, and which had often been similarly treated at different times to make up the quantity. That had been reduced separately, and had averaged 6 dwts. as well as the other. The other thing was that after Mr. Belt's time, and under Mr. Smeddle, the expenditure was reduced very materially, and the present manager seemed very much inclined to keep down the reduction in the cost, and in addition to that to give good returns, which was one of the chief reasons why the directors had hope in the future. The directors had received a letter from their good friend Col. Weller, who was unable to be present to-day, in which he stated—

"There is only one part of Mr. White's observations on the condition of the several mines which is disappointing, and that is that it will take quite two years before the whole of these mines can be brought into full operation, after which good and permanent profits can be realized."

Later on in his letter Col. Weller stated—

"But surely that result might be greatly expedited if he was supplied with the means of employing the extra hands to the full extent which could be set to work advantageously on all the mines simultaneously. The whole work might possibly be completed in six months if he had the command of funds, and I suggest that the necessary amount might be raised to the extent of 3000£. by the issue

of debentures on advantageous terms, and I make the suggestion as probably worthy of the attention of the board."

Now, he thought there was a great deal in that suggestion, but he simply referred to it because the same idea occurred to the board also, but the directors found it would be impossible to raise money by debentures, or in any other way, for the purpose unless they had from their manager out there a clear statement that it would do what was required, and up to the present time such statement had not been received. Therefore, the directors had considered the subject worthy of attention, and had actually sent a letter out to Mr. White on the subject, asking for a particular return, before they received Col. Weller's letter. The losses on the last twelve months to the end of June amounted to 2282l. 18s. 6d. In drawing up the general balance-sheet there had always been some confusion on the part of some of the shareholders, who had imagined the cost put down was one year's cost, therefore the directors had clearly stated the mine cost for the six years, and the London expenses for the six years, so all they had to do to get the average was to divide that by six. He had divided it by six to get the average of the falling off had been the small quantity of ore treated. The average return on the six years had been 3360 ounces of gold, and for the last year the return had only amounted to 1800 ounces in the same way, whereas the average value on the six years had been 9100£.; last year the value of the gold received was only 4872£. as the expenses were pretty much the same, that accounted for the very high cost per ton at which the gold had been extracted in this last year. At a meeting which the directors had with some of the large shareholders the directors stated the necessity of a change of managers, which those shareholders seemed to look upon as a very necessary thing. Mr. Danby was recalled on June 24 last, but although Mr. Danby had since been in this country he had not presented himself at the office. He would not go into particulars of that matter, as the board had been advised to put the whole thing into the hands of their solicitor, but the secretary would be happy to give any of the shareholders information privately. In conclusion, the Chairman moved the adoption of the report and accounts.

Mr. PAKE PITTR seconded the resolution.

Mr. PALMER thought that the change in the management would give satisfaction to all the shareholders, and he thought that they were indebted to Messrs. Harvey for having recommended Mr. White to the directors. There was no doubt that the failure had arisen entirely from the bad management at the mine. There was no doubt ore was there in paying quantities, provided they could get an efficient and honest man as manager at the mine. He hoped the result of Mr. White's labours would be satisfactory to the shareholders.

The CHAIRMAN said Mr. White had solved one doubt which existed. The pneumatic stamps were said to be useless, and did not treat the ore properly. Mr. White had found that the plates on which the gold was to be amalgamated were fixed on the stamps in a manner which caused them to vibrate, so that it was impossible for amalgamation to take place, but Mr. White stated that he could remove that defect with ease. Mr. White had also suggested a plan by which they could economise the existing water, by the construction of a small reservoir. He also referred to the fact that by the existing arrangement in connection with the stewardship and office expenses, very considerable saving had been effected in the expenditure, and they had the advantage of the knowledge of Mr. Truran, who had been on the mines, and knew all about them.

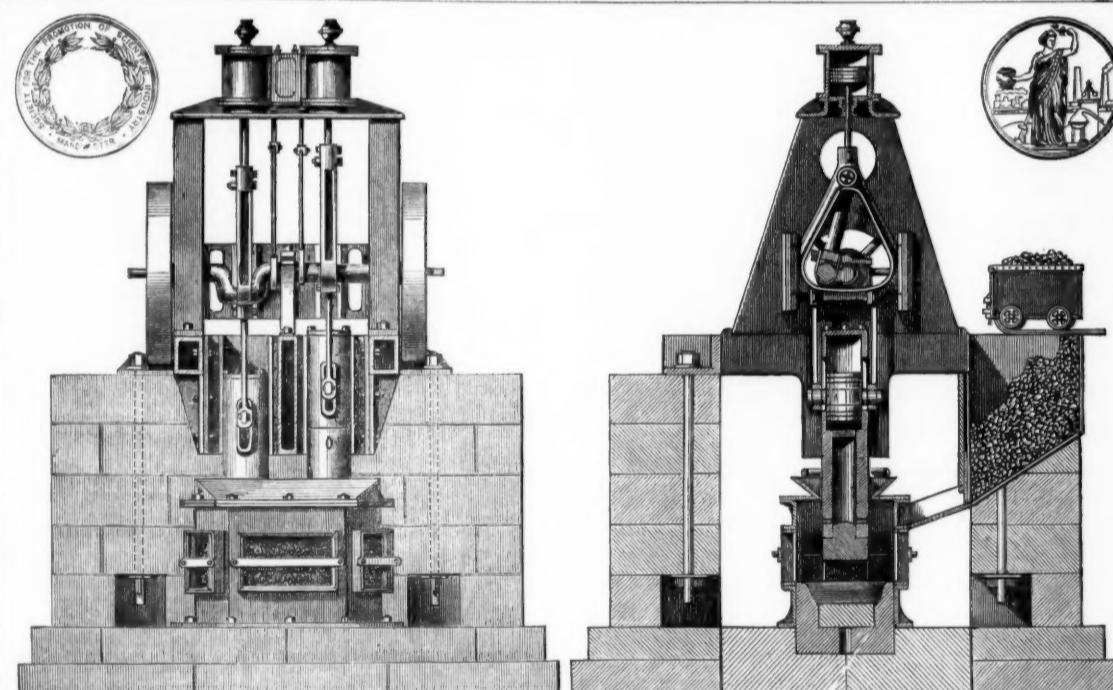
The report was then adopted.

On the motion of Mr. SYKES, seconded by Mr. PALMER, Lord Nelson was re-elected a director of the company.

The auditor, Mr. W. F. MOATES, was also re-elected.

On the motion of Mr. TURNBULL, seconded by Mr. SYKES, a cordial vote of thanks was passed to the Chairman and directors, and the meeting broke up.

[For remainder of Meetings, see to-day's Journal.]



SHOLL'S PATENT DIRECT-ACTING PNEUMATIC STAMPERS, For Pulverising Tin and Lead Ores, Gold Quartz, &c.,

SOLE MAKERS FOR CORNWALL,

N. HOLMAN AND SONS,

ST. JUST FOUNDRY, NEAR PENZANCE, CORNWALL.

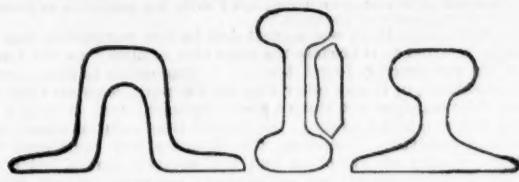
All objectionable features of "wear and tear" common to the original and existing Pneumatic Stamps (driven by belts) are removed in this patent, and leather bands and stuffing boxes entirely dispensed with, the pneumatic piston being reciprocated into the compressing chambers by direct-action from without. These double machines are guaranteed to be of the capacity of 36 ordinary heads of cam and lifter stamps, and engineers will at once see that, inasmuch as the power is directly applied to its work (without the medium of belts and other gearing), the minimum consumption of coal (all other conditions being equal) must be the result.

The COST OF THESE MACHINES (including boiler) is about ONE-THIRD OF THE ORIGINAL CAM AND LIFTER STAMPS, to do the same work.

ROTARY STAMPERS SUPPLIED ON THE SAME PRINCIPLE, WITHOUT STUFFING BOXES OR GLANDS, WHERE RUNNING GEAR EXISTS, OR WITH HORIZONTAL CONDENSING ENGINES AND BELTS TO DRIVE THEM, IF PREFERRED.

Also, SOLE MAKERS OF STEPHENS' PATENT PULVERISER.
MINING AND OTHER MACHINERY CONSTANTLY ON SALE,
NEW AND SECOND-HAND.

JOHN BEATSON, DERBY.



IRON AND STEEL RAILS, of all sections, from 10 to 82 lbs. per yard, new, defective, or second-hand.

POINTS AND CROSSINGS, FISH PLATES, BOLTS, NUTS, CHAINS, AND SPIKES. LOCOMOTIVE ENGINES AND MACHINERY.

MALLEABLE AND PIG-IRON OF ALL KINDS.

Delivered at all Ports and Railway Stations in Great Britain.

A SECONDHAND SIX-WHEELED TANK LOCOMOTIVE FOR SALE.

ELECTRIC BELL SIGNALS FOR COLLIERIES, FACTORIES, WAREHOUSES, &c., WITH OR WITHOUT GALVANIC BATTERIES.

NEW SYSTEM—CAN BE RUNG AT ANY PART OF THE ROAD. Cheap, safe, and reliable. Efficiency guaranteed. LINES OF TELEGRAPH erected and maintained. LIGHTNING CONDUCTORS, &c. For estimates and particulars apply to—

SYDNEY F. WALKER,

LATE G. E. SMITH,

TELEGRAPH ENGINEER,

COMMERCIAL BUILDINGS, LONG ROW, NOTTINGHAM.

S. T. SHUTTLEWORTH,

PATENTEE OF THE IMPROVED APPARATUS FOR PREVENTING INCRUSTATION IN BOILERS, &c.

MANUFACTURER OF SUPERIOR

GUN METAL STEAM COCKS, VALVES, BOILER MOUNTINGS, AND CAST IRON STEAM AND SAFETY VALVES, with GUN METAL SEATS ALL ORDERS PROMPTLY EXECUTED.

LONDON OFFICE,—51, BISHOPSGATE STREET WITHIN, E.C.

VALVES AND STEAM COCKS.

Cast-iron Steam Valve, with Gun Metal Seats, new and improved pattern. (with flanges.) (Screw Gland.) Gun Metal Screw Gland Steam Cock (black), shell pattern, female ends.

(Pin Gland.) Gun Metal Pin Gland Steam Cock (black), shell pattern, female ends—

Prices— $\frac{1}{4}$ in., 2s. 8d. $\frac{3}{8}$ in., 4s. 4d. $\frac{1}{2}$ in., 9s. 6d. $\frac{5}{8}$ in., 13s. 6d. 21s. 6d. 32s. each.

(Screw Bottom.) Gun Metal Screw Bottom Steam Cock (black), shell pattern, female ends, or male and female ends—

Prices— $\frac{1}{4}$ in., 2s. 8d. $\frac{3}{8}$ in., 4s. 4d. $\frac{1}{2}$ in., 9s. 6d. $\frac{5}{8}$ in., 13s. 6d. 21s. 6d. 32s. each.

(London Pattern.) Gun Metal Steam Cock, London shell pattern, polished bright, male and female ends; the heaviest in the trade—

$\frac{1}{4}$ in., 4s. 6d. $\frac{3}{8}$ in., 7s. 1 in., 10s. : $\frac{1}{2}$ in., 15s. : $\frac{5}{8}$ in., 22s. : 2 in., 32s. each.

Gun Metal Steam Valves, brass or iron wheels; improved, screwed female ends—

$\frac{1}{4}$ in., 1 in., $\frac{3}{8}$ in., $\frac{1}{2}$ in., 2 in., $\frac{5}{8}$ in., 2 in., 3 in., 3 in., 4 in.

4s. 6d. 6s. 6d. 8s. 6d. 11s. 6d. 14s. 22s. 6d. 32s. 48s. 60s. 80s. 120s. each.

The same with Flanges—

$\frac{1}{4}$ in., 7s. : $\frac{3}{8}$ in., 8s. : 1 in., 12s. : $\frac{1}{2}$ in., 17s. 6d. : $\frac{5}{8}$ in., 26s. : 2 in., 32s. 6d. each.

Gun Metal Ground Steam Union Joints—

$\frac{1}{4}$ in., 3s. : $\frac{3}{8}$ in., 4s. : 1 in., 11s. : $\frac{1}{2}$ in., 14s. : 2 in., 21s. each.

Gun Metal Safety Valve, with Lever—

$\frac{1}{4}$ in., 6s. : $\frac{3}{8}$ in., 8s. : 1 in., 10s. : $\frac{1}{2}$ in., 12s. 6d. : $\frac{5}{8}$ in., 15s. : 2 in., 20s. each.

Gun Metal Stop Whistle—

1 in., 9s. 6d. : 2 in., 12s. : $\frac{3}{8}$ in., 16s. : 3 in., 25s. : $\frac{5}{8}$ in., 33s. : 4 in., 40s. each.

Single Tallow Cock—

1 in., 6s. 6d. : 2 in., 8s. 6d. : 3 in., 12s. 6d. : 4 in., 17s. 6d. each.

Double Tallow Cock—

1 in., 9s. 6d. : 2 in., 12s. : 3 in., 16s. : 4 in., 21s. each.

Gun Metal Throttle Valves, screwed for iron pipe—

$\frac{1}{4}$ in., 6s. 6d. : 1 in., 9s. 6d. : 1 $\frac{1}{2}$ in., 14s. 6d. : 2 in., 21s. each.

Gun Metal Pet Cock, with cleaning screw—

3 in., 11d. : $\frac{3}{4}$ in., 4s. 6d. : $\frac{5}{8}$ in., 6s. : $\frac{1}{2}$ in., 7s. : 1 in., 10s. each.

Gun Metal Pet Cock—

$\frac{3}{4}$ in., 8s. 8d. : $\frac{5}{8}$ in., 6s. : $\frac{1}{2}$ in., 6s. each. Screwed.

Gun Metal Blow-off Cocks—

$\frac{3}{4}$ in., 7s. 6d. : 1 in., 10s. 6d. : $\frac{1}{2}$ in., 14s. 6d. : $\frac{5}{8}$ in., 19s. : 2 in., 33s. each.

GUN METAL WATER GAUGE MOUNTINGS.

Set of Gun Metal Gauge Mountings, ebony handles, ordinary pattern.

$\frac{1}{4}$ in. glass 18s.

Ditto ditto ditto $\frac{3}{8}$ in. glass 23s.

Ditto ditto ditto $\frac{1}{2}$ in. 30s.

Set of Gun Metal Water Gauge Mountings, with solid bottom cocks and gun metal packing rings ground on to top of plug, thus preventing the possibility of leakage, with back nuts and cleaning screws; gun metal handles, bore for either $\frac{1}{4}$ in. or $\frac{3}{8}$ in. glass 31s.

Set of Gun Metal Water Gauge Mountings, similar to the above, but with gun metal gauge, bored for $\frac{1}{4}$ in. or $\frac{3}{8}$ in. glass 31s.

Set of magnificient Gun Metal Water Gauge Mountings, very heavy, with solid bottom cocks, as above, with cleaning caps, back nuts, &c., &c., bored for either $\frac{1}{4}$ in. or $\frac{3}{8}$ in. glass 44s.

Ditto ditto ditto 56s.

Set of Gun Metal Water Gauge Mountings, with screwed bottom, brass handles, back nuts, and cleaning screws, bored for $\frac{1}{4}$ in., $\frac{3}{8}$ in., or $\frac{1}{2}$ in. glass 27s.

Set of Gun Metal Gauge Mountings, similar to the above, but lighter, and bored for $\frac{1}{4}$ in. or $\frac{3}{8}$ in. glass 29s.

Set of Gun Metal Water Gauge Mountings, similar to the above, but lighter, and bored for $\frac{1}{4}$ in. or $\frac{3}{8}$ in. glass. These are suitable for Agricultural Engines 18s. 9d.

Set of Gun Metal Gauge Mountings, with hollow plugs, upon Needham's principle (suitable for locomotives), bored for $\frac{1}{4}$ in. or $\frac{3}{8}$ in. glass 36s.

Set of "Valve" Gun Metal Gauge Mountings ($\frac{1}{4}$ turn to blow off), with back nuts and ebony handles, bored for $\frac{1}{4}$ in. or $\frac{3}{8}$ in. glass 28s.

BEST GREEN GAUGE GLASS TUBES.

Inches $\frac{1}{4}$ in. $\frac{3}{8}$ in. $\frac{1}{2}$ in. $\frac{5}{8}$ in. 1 in. outside diam.

long. s. d. s. d. s. d. s. d. s. d.

12. 3 9. 4 6. 5 4. 6 8. 8 0 per doz.

13. 4 0. 5 0. 6 0. 7 4. 8 8. 8

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18. 5 3. 7 6. 9 4. 10 8. 12 0. 12 0.

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20. 5 9. 8 6. 10 8. 12 0. 12 0. 13 4.

21. 6 0. 9 0. 11 4. 12 8. 14 0. 14 0.

22. 6 3. 9 6. 12 0. 13 4. 14 0. 14 8.

23. 6 6. 10 0. 12 8. 14 0. 15 4. 15 4.

24. 6 9. 10 6. 13 4. 14 8. 16 0. 16 0.

Steam Packing, Asbestos, Soapstone, Core, Blacklead, and all other kinds kept in Stock.

STEAM PRESSURE and VACUUM GAUGES, Bourdon's and other Makers.

ANTIFRICTION METAL—Babbitt's, Fenton's, and Kingston's.

LUBRICATORS—Harrington's, Roseau's, and NEEDLE, &c.

Sole Makers of HOW'S PATENT SALINOMETERS and HYDROMETERS for Marine Boilers.

HYDROMETERS in Brass or Glass.

TERMOMETERS for SALINOMETERS and other purposes.

STEAM ENGINE INDICATORS.

HAMMERS, RATCHET BRACES, STOCKS, and DIES for either Whitworth's or Gas Threads.

DUDGEON'S PATENT TUBE EXPANDERS and HYDRAULIC JACKS.

LATHES, DRILLING, PUNCHING, and SHEARING Machines.

PORTABLE and FIXED ENGINES, and all kinds of BOILERS, WATER HEATERS, &c.

LEATHER MACHINE BELTING, HOSE, &c.

GREEN'S and other BELL FASTENINGS, OIL FEEDERS, NEEDLE LUBRICATORS and PISTON RINGS.

BOILER COMPOSITION, COTTON WASTE, and STEAM PACKING, of all kinds.

WHEELS, AXLES, PULLEYS, and SHAFTING.

VICES, BENCH, SWIVEL and PARALLEL, and every kind of Engineering requirement for Shop or Engine Room.

GUN METAL and other CASTINGS made to DRAWINGS to any SPECIFICATION submitted.

SHARP STEWART'S INJECTORS, A. FRIEDMANN'S ditto, GRESHAM and CRAVEN'S ditto, and other Makers.

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AGENT FOR EZARD'S PATENT DUPLEX GAS IRONS.

Quotations given if required for any quantity of the above articles.

Special terms to Merchants, Shippers, and the Trade.

SUPPLEMENT TO THE MINING JOURNAL.

DEC. 1, 1877.

DEC.

BLAKE'S PATENT STEAM PUMP.

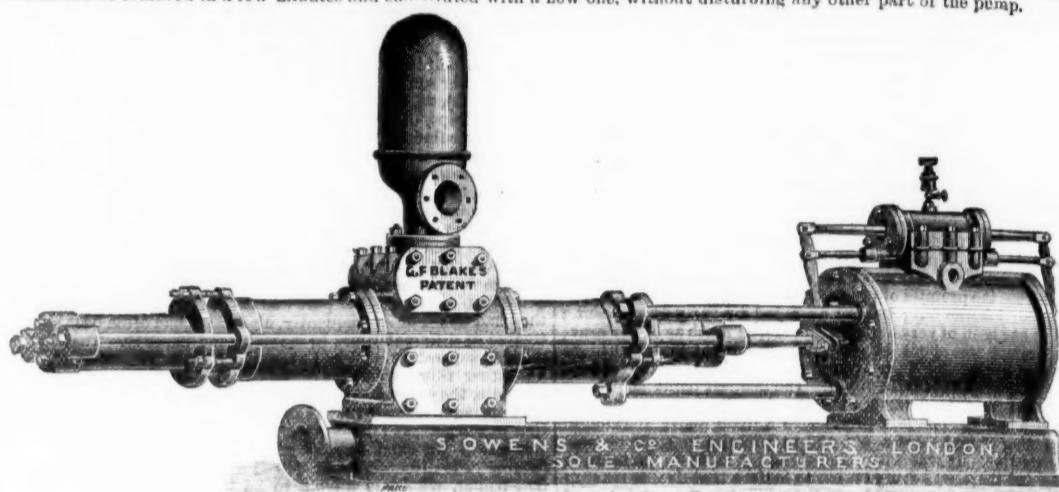
MORE THAN 10,000 IN USE.

SOLE MAKERS FOR GREAT BRITAIN,

S. OWENS & CO.,

Hydraulic and General Engineers, Whitefriars-street, London; Agent in Scotland: W. Hume, 195, Buchanan-street, Glasgow.

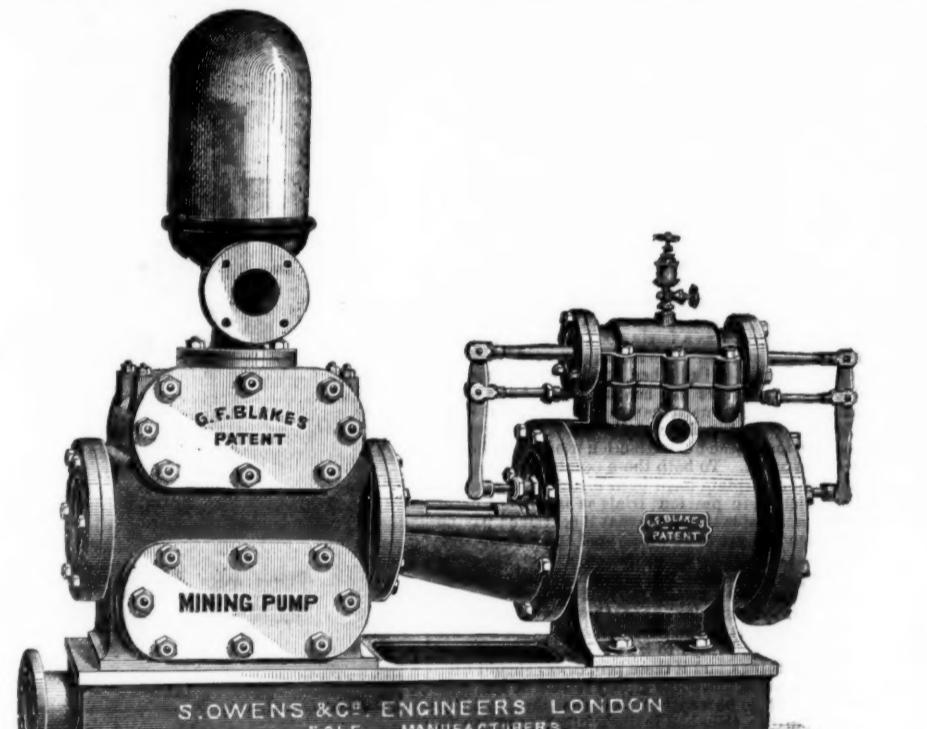
These PUMPS from their SIMPLICITY, RELIABILITY, DURABILITY, and ECONOMY are SPECIALLY SUITED FOR MINING PURPOSES, where large quantities of water require to be raised from great or medium depths with CERTAINTY. They are double-action in their construction, throwing a constant stream of water, can be made of any stroke to suit the space in which they have to work, can be arranged with any combination of steam and water cylinders to suit the pressure and lift against which it is desired to work them, are made of the very best materials and highest class of workmanship, and all working parts can be readily got at by any ordinary workman, and replaced if necessary by a duplicate part (all such being interchangeable) in the shortest possible time. For situations where gritty and sandy water has to be pumped the DOUBLE-PLUNGER PATTERN is recommended, Where space is limited the PISTON PUMP is better suited, a novel feature of which is the PATENT REMOVEABLE LINING, which can be removed in a few minutes and substituted with a new one, without disturbing any other part of the pump.



Blake's Improved Double-plunger Steam Pump.

S. OWENS AND CO.,

In placing the BLAKE STEAM PUMP before the mining world, believe they are offering the BEST, MOST RELIABLE, and ECONOMICAL PUMP that has yet been made, and solicit an inspection of various sizes in operation at their works, Whitefriars-street, Fleet-street, London.



Blake's Improved Mining Pump, with Patent Removeable Lining to Pump Cylinder,

Any combination of these Pumps may be had to suit circumstances. The following are some of the SIZES SUITABLE FOR MINING PURPOSES:—

Dia. of steam cylinders, in.	12	12	12	12	14	14	14	16	16	16	18	18	18	18	20	20	20	24</th

AWARDED THE PRIZE MEDALS AT LEEDS, MANCHESTER, AND WREXHAM EXHIBITIONS, 1875 AND 1876.

HADFIELD'S STEEL FOUNDRY COMPANY,

ATTERCLIFFE, SHEFFIELD,

DEVOE THEIR EXCLUSIVE ATTENTION TO THE MANUFACTURE OF

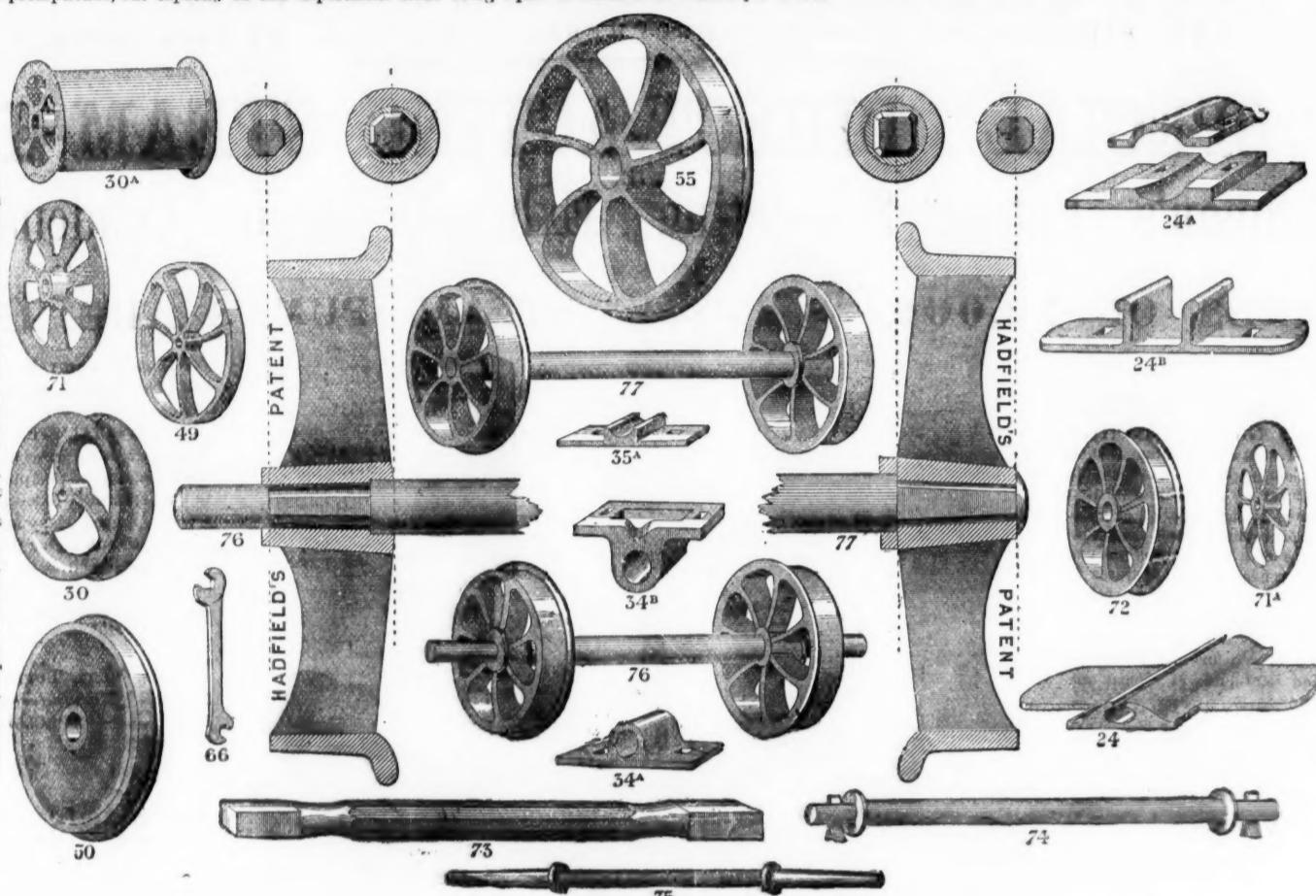
CRUCIBLE STEEL CASTINGS, for Engineering and Machine Purposes,

AND ARE THE SOLE MAKERS OF

HADFIELD'S CRUCIBLE STEEL WHEELS.

One of our departments is specially adapted for the manufacture of these Wheels (as shown below), for Collieries, Ironstone Mines, Slate Quarries, Ironworks, Lead Mines, &c., &c. We have made, and are now making, many HUNDRED THOUSANDS; and having Patented a New Method of Fitting Wheels upon axles, being cheap, effective, and expeditious, we can execute orders entrusted to us with promptitude, our capacity in this department alone being equal to about 2000 wheels per week.

N.B.—Prices per Set of Wheels and Axles, fitted complete, forwarded on receipt of diameter of wheel on tread, depth of tred, real gauge, and thickness of axles and rolling load.



[This Sheet of Drawings is Copyright.]

HADFIELD'S PATENT METHOD OF FITTING WHEELS UPON AXLES.

The advantages of the above system are that the Wheels being forced upon a Taper Square-ended Axle, by Machinery, and then riveted (the machine securing truth), it is impossible that they can come loose or get within gauge. They are very heavily fitted on, and run exceedingly true.

We construct the Arms of wheels upon the curved principle (as shown in the drawings above), consequently the shrinkage or cooling of the Castings is not interfered with, thus securing the greatest advantages of our very strong material.

CRUCIBLE CAST-STEEL WHEELS, when cast by us, are made from one-third to one-half lighter than Cast-Iron. They cannot be broken while working, even with rough usage, and will wear at least twelve times as long as Cast Iron, thus saving animal and steam power, and reducing wear and tear immensely.

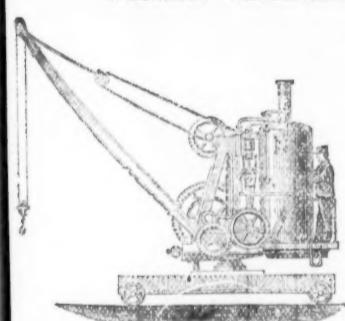
We would also draw special attention to our INCLINE PULLEYS and CAGE GUIDES, the adoption of which will prove highly advantageous.

CHAPLIN'S PATENT STEAM ENGINES AND BOILERS.

PRIZE MEDAL, INTERNATIONAL EXHIBITION, 1862.

STEAM CRANES,

Portable or Fixed, for Railways, Wharves, &c., for unloading COAL, BALLAST, &c., To hoist 15 cwt. to 30 tons.



LOCOMOTIVES,

6 to 27-horse power. For Steep Inclines and Sharp Curves. Gauge from 2 feet upwards. Geared to draw very heavy weights in proportion to their power, and SPECIALY SUITABLE FOR



Contractors' Work, Railway Sidings, Coal Mines, Quarries, Gas Works, &c

WIMSHURST, HOLICK, & CO., ENGINEERS.

Works: REGENT'S CANAL DOCK, 602, COMMERCIAL ROAD EAST, LONDON, E. (Near Stepney Station).

CITY OFFICE: 2, WALBROOK, LONDON, E.C.

Parties are cautioned against using or purchasing Imitations or Infringements of these Patent Manufactures.

E M M E T ' S

A1 PATENT BRICK MACHINE.

Massive; durable; cheap; takes little power, and gives PERFECT SATISFACTION.

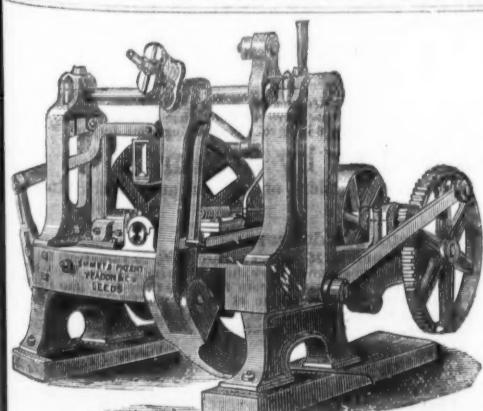
This is the ONLY Machine which presses the Brick equally on BOTH sides, each plunger entering the mould plate $\frac{3}{8}$ in., and turning out 12,000 SQUARE, SOLID, PRESED Bricks per day, READY AT ONCE FOR THE KILN.

SOLE MAKERS—

YEADON AND CO.,

CROWN POINT FOUNDRY, LEEDS.
Makers of EVERY DESCRIPTION of Colliery and Brick Yard Plant.

LONDON AGENTS—
HAUGHTON AND CO., NO. 122, CANNON STREET, E.C.
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PLAMBECK AND DARKIN, 171, QUEEN VICTORIA ST., E.C.



BICKFORD'S PATENT FOR CONVEYING CHARGE IN



SAFETY FUSE

FIRE TO THE

BLASTING ROCKS, &c.

OBTAINED THE PRIZE MEDALS AT THE "ROYAL EXHIBITION" OF 1851; AT THE "IMPERIAL EXPOSITION" OF 1862 AND 1874, IN LONDON; AT THE "INTERNATIONAL EXPOSITION," HELD IN PARIS, IN 1865; AT THE "INTERNATIONAL EXPOSITION," IN DUBLIN, 1868; AT THE "UNIVERSAL EXPOSITION," IN PARIS, 1867; AT THE "GREAT INDUSTRIAL EXPOSITION," AT ALTONA, IN 1869; TWO MEDALS AT THE "UNIVERSAL EXPOSITION," VIENNA, IN 1873; AND AT THE "EXPOSICION NACIONAL ARGENTINA," CORDOVA, SOUTH AMERICA, 1872.



BICKFORD, SMITH AND CO., OF TUCKINGMILL, CORNWALL; ADELPHI BANK CHAMBERS, SOUTH JOHN-STREET, LIVERPOOL; AND 85, GRACECHURCH-STREET, LONDON, E.C., MANUFACTURERS AND ORIGINAL

PATENTEES OF SAFETY-FUSE, HAVING BEEN IN FORMED THAT THE NAME OF THEIR FIRM HAS BEEN ATTACHED TO THE TRADE AND PUBLIC TO THE FOLLOWING ANNOUNCEMENT:—

EVERY COIL OF FUSE MANUFACTURED BY THEM HAS TWO SEPARATE THREADS PASSING THROUGH THE COLUMN OF GUNPOWDER, AND BICKFORD, SMITH, AND CO. CLAIM SUCH TWO SEPARATE THREADS AS THEIR TRADE MARK.

THE TAVISTOCK IRONWORKS, ENGINEWORKS FOUNDRY, AND HAMMER MILLS,

TAVISTOCK, DEVON.

NICHOLLS MATTHEWS, AND CO. ENGINEERS, BRASS AND IRON FOUNDERS, BOILER MAKERS AND SMITHS.

MAKERS OF

CORNISH PUMPING, WINDING, AND STAMPING ENGINES; STEAM CAPSTANS AND CRUSHERS; WATER-WHEELS; PUMP-WORK; SHOVELS, AND HAMMERED IRON FORGINGS OF EVERY DESCRIPTION.

Also of SPUR, MORTICE, MITRE, BEVEL, and other WHEELS, of any diameter up to 12 feet, made by Scott's Patent Moulding Machine, without the aid of patterns, and with an accuracy unattainable by any other means.

MACHINERY OF FOREIGN MINES carefully prepared.

SECONDHAND MINING MACHINERY, in good condition, always on sale, at moderate prices.

WILTON'S MATHEMATICAL INSTRUMENT ESTABLISHMENT, REMOVED from St. Day to A. JEFFERY'S, CAMBORNE.

W. H. WILTON begs to thank his friends for their liberal support for so many years, and informs them that (having opened business at Valparaiso) he has now declined business in England in favour solely of Mr. A. JEFFERY, MATHEMATICAL INSTRUMENT MAKER, CAMBORNE, whom he considers (having been an assistant to his father for several years) is in every way capable of creditably maintaining the good name universally awarded to Wilton's instruments.

A. JEFFERY

Respectfully begs to inform Mine Managers, Surveyors, Engineers, &c., the having purchased Mr. Wilton's business, and the very valuable acquisitions and appliances belonging thereto, he has enlarged his Mathematical Instrument Manufactury, and is prepared to supply THEODOLITES, DIALS, POCKET DIALS, LEVELS, TRAVERSING AND PLAIN PROTRACTORS, CASES OF DRAWING INSTRUMENTS, MEASURING CHAINS AND TAPES, ASSAYERS' SCALES AND WEIGHTS, ENGINE COUNTERS, and, in short, every description of Instruments used in SURVEYING, MEASURING, MAPPING, &c.

Repairing in all its branches promptly attended to.



PARIS INTERNATIONAL EXHIBITION, 1867.



VIENNA INTERNATIONAL EXHIBITION, 1873.



LONDON INTERNATIONAL EXHIBITION, 1874.



CORNWALL POLYTECHNIC SOCIETY, 1867 and 1873.

TANGYE BROTHERS AND HOLMAN,

10, LAURENCE POUNTNEY LANE, LONDON, E.C.,

AND BIRMINGHAM, (TANGYE BROTHERS), CORNWALL WORKS, SOHO.

The "SPECIAL" DIRECT-ACTING STEAM PUMP, WITH Holman's Patent Self-acting Exhaust Steam Condensers.

UPWARDS OF 12,000 "SPECIAL" STEAM PUMPS ARE IN USE.

After eight years of successful application for all purposes to which steam-driven pumps can be applied, THE "SPECIAL" STEAM PUMP STILL MAINTAINS THE FIRST POSITION IN THE MARKET, notwithstanding that it alone—of all direct-acting pumps—has been subjected to the great variety of severe tests that must be encountered in such a period of time. Some valuable improvements have been suggested in the course of a long experience, and their adoption has rendered the apparatus at once the simplest and most certain in action. There is absolutely no extraneous gear, and the steam cylinder is no longer than the pump. The valves are of easy access, and are suited for pumping fluids and semi-fluids of almost any consistency.

Holman's Condenser

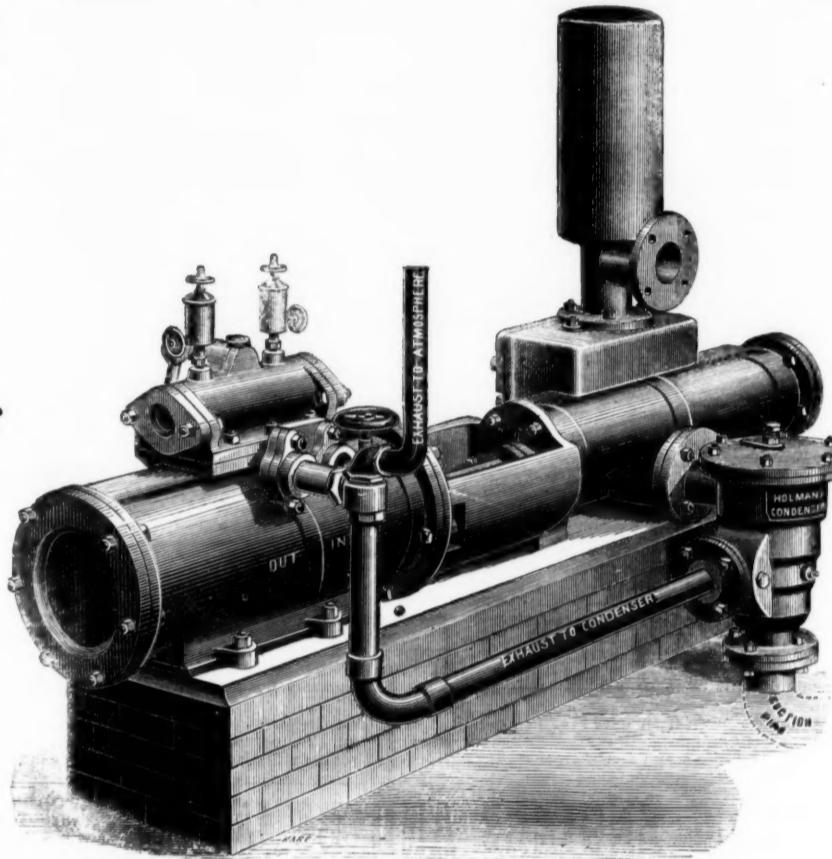
TURNS WASTE STEAM INTO
GREAT POWER.

SAVES HALF ITS COST IN PIPES AND
CONNECTIONS.

PREVENTS ALL ESCAPE OF STEAM IN
MINES OR ELSEWHERE.

REQUIRES NO EXTRA SPACE.

SAVES TWENTY TO FIFTY PER CENT.
OF FUEL.



WILLIAM ELLIOT, Esq., of the Weardale Iron and Coal Company, writes under date Sept. 17th, 1875, as follows:—"We have now THIRTY-FIVE of your SPECIAL STEAM PUMPS in operation at the various collieries under my charge—some of them employed pumping water out of our pits to the depth of 50 fms.—others employed in the pits, and a good many feeding Boilers. I have no hesitation in saying that we have found them the Cheapest and Best Pumps of the kind we have tried. I can with confidence recommend them to intending purchasers."

Messrs. BURT, BOULTON, and HAYWOOD, Chemical Manufacturers, of London, have FORTY of the "SPECIAL" STEAM PUMPS in use at their works.

HOLMAN'S CONDENSERS

Are made to suit any size and kind of Steam Pump. They form a part of the suction pipe of the Pump, and while they effectually condense the exhaust steam they produce an average vacuum of 10 lbs. per square inch on the steam piston, increasing the duty of the Engine, and effecting a saving in fuel of from 20 to 50 per cent.

In Mining operations these Condensers will be of great value.

All Boiler Feeders are recommended to be fitted with these Condensers, as not only is the exhaust steam utilised in heating the feed water, but is returned with it into the boiler.

GREAT REDUCTION IN PRICES.

The following sizes are suitable for low and medium lifts:—

Diameter of Steam Cylinder ...In.	3	4	4	4	5	5	6	6	6	7	7	7	7	8	8	8	8	9	9	9	9	10	10	
Diameter of Water Cylinder ...In.	1½	2	3	4	3	4	5	3	4	5	6	3	4	5	6	7	4	5	6	7	8	5	6	
Length of StrokeIn.	9	9	9	9	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	24	12	
Gallons per hour	680	815	1830	3250	1830	3250	5070	1830	3250	5070	7330	1830	3250	5070	7330	9750	3250	5070	7330	9750	13,000	5070	7330	
Price of Special Pump ...£	16	18	20	25	22	10	27	10	32	10	25	30	35	40	30	35	40	45	50	40	45	55	65	50
Extra, if fitted with Holman's Condenser and Blow-through Valve	£7	£7	£9	£11	£8	10	£11	10s	£12	10s	£9	£12	£15	£15	£10	£13	£15	£16	£22	£13	£16	£16	£22	£16

CONTINUED.

Diameter of Steam Cylinder...In.	10	10	10	10	12	12	12	12	12	14	14	14	14	14	14	16	16	16	16	16	18	18	18	
Diameter of Water Cylinder...In.	7	8	9	10	6	7	8	9	10	12	7	8	9	10	12	14	8	9	10	12	14	9	10	
Length of StrokeIn.	12	18	24	24	18	18	18	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	
Gallons per hour	9750	13,000	16,519	20,000	7330	9750	13,000	16,519	20,000	30,000	9750	13,000	16,519	20,000	30,000	40,000	13,000	16,519	20,000	30,000	40,000	16,519	20,000	
Price of Special Pump ..£	65	75	90	100	75	80	85	110	120	140	110	120	130	140	160	180	140	150	160	180	200	180	190	210
Extra, if fitted with Holman's Condenser and Blow-through Valve	£23	£24	£35	£35	£20	£27	£27	£38	£38	£50	£28	£28	£40	£40	£55	£55	£28	40	£40	£55	£55	£45	£45	£56

Intending purchasers of Steam Pumps would do well to observe the great length of stroke, short steam cylinder, and short piston of the "Special" Steam Pump, as compared with the short stroke, long steam cylinder, and long piston of the Pumps of other makers, as the efficiency and durability of the machine, and the space occupied by same, greatly depend upon this. The advantage of long strokes will be obvious when purchasers are reminded that each set of suction and delivery valves of a "Special" Steam Pump with 24 in. stroke, running at 120 ft. per minute, would open and close only 30 times per minute, as against 120 times per minute in a Pump with only 6 in. stroke performing same duty.

The "Special" Steam Pump can be worked by Compressed Air as well as by Steam.

HUNDREDS of these PUMPS are USED for HIGH LIFTS IN MINES, for which purpose they are made with 21, 24, 26, 28, 30, and 32-inch Steam Cylinders, and 36, 48 and 72-inch Strokes.

The following Testimonial gives one Example of the Power Gained by the action of Holman's Patent Condensers:—

NORLEY COLLIERY, WIGAN.

MESRS. TANGYE BROTHERS AND HOLMAN.

GENTLEMEN.—I have great pleasure in recording my entire satisfaction with the working of the Holman's Patent Steam Pump Condenser which you have supplied to us. The complete condensation of the steam is, apart from its value in the strict economic sense, a most valuable feature in the drainage of underground work-

ings. The perfect manner in which this important result is accomplished by your Condenser is extremely creditable to you, and merits the thanks and commendation of the Mining Engineer. When we start the "Special" Steam Pump the Condenser commences working automatically, and maintains a constant vacuum of 10½ lbs. per square inch, even when we run the Pump upwards of 80 strokes (106 feet) per minute. It may perhaps be interesting to you to know that when we were running the Pump at 64 strokes (168 feet) per minute, the steam gauge

indicated a steam pressure of 36 lbs. per square inch, 80 yards from the Pump, and the Condenser vacuum gauge on the exhaust pipe indicating a steady vacuum of 21½ inches. I turned the exhaust steam from the Condenser into the atmosphere, when the speed at once fell to 44 strokes per minute. The working economy thus shown is really so great that the cost of the Condenser must be saved in a very short time.

(Signed)

J. THOMPSON.

NORTH OF ENGLAND HOUSE ... TANGYE BROTHERS AND RAKE, ST. NICHOLAS BUILDINGS, NEWCASTLE-ON-TYNE.
SOUTH WALES HOUSE ... TANGYE BROTHERS AND STEEL, TREDEGAR PLACE, NEWPORT. MON.; and OXFORD BUILDINGS, SWANSEA.

STEAM BOILERS

OF ALL KINDS MADE TO ORDER AT THE SHORTEST NOTICE BY THE

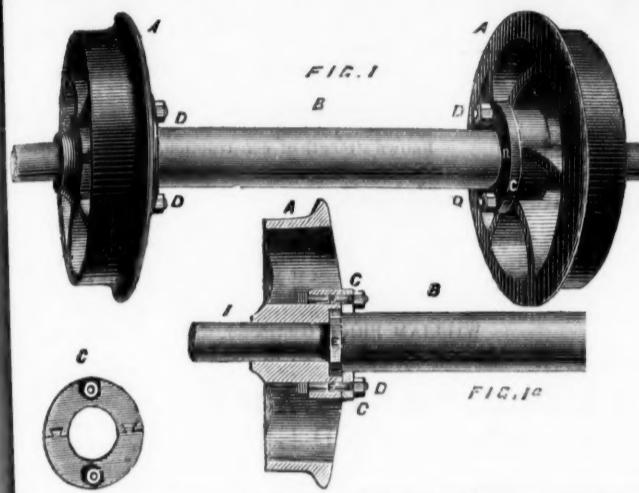
TURNBRIDGE IRON & BOILER WORKS COMPANY, LIMITED, HUDDERSFIELD
London Agent—Mr. W. PARSEY, 46, FISH STREET HILL, E.C.

JOSEPH FENTON & SONS,
SYKES WORKS, SHEFFIELD, and 118, Cannon-street, LONDON, E.C.,

MANUFACTURERS OF
CRUCIBLE CAST STEEL CASTINGS,

HAVE PLEASURE IN CALLING THE ATTENTION OF THE MINING WORLD TO THEIR

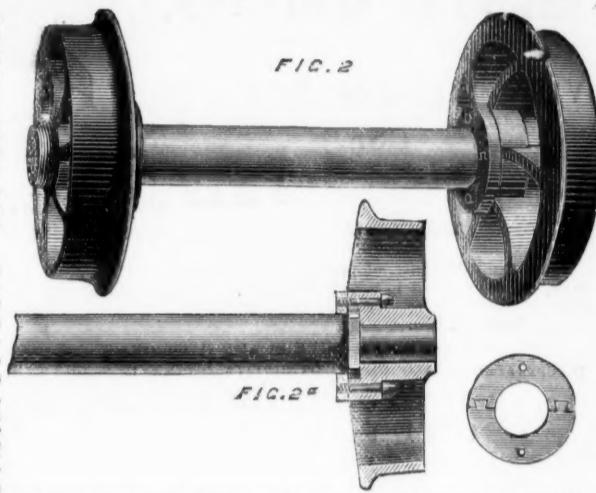
Patent Method of Fitting up Cast Steel Wheels and Axles.



Figs. 1 and 1a show a longitudinal view and plan of a pair of cast wheels fitted up for outside bearings. A A, are the wheels; B, is the axle; C C, the washers; D D, the bolts; E, the collar on axle B; and F, the recessed boss in the wheel.

The wheel is cast with a recessed boss in the inside, made to any shape, corresponding in shape and depth with a collar formed on the axle. Figs. 2 and 2a show a longitudinal view and plan of a pair of cast wheels fitted up for inside bearings. The washers are secured to the boss of the wheel in outside bearings by bolts and nuts, and in inside bearings by set screws.

The advantages of the above system are:—A, the singular simplicity of fitting—enabling any inexperienced person, with the aid of a spanner or screw-driver, to detach the wheels from the axle or fit them together in a very short time. B, perfect solidity, the wheels and axles becoming as one piece. C, durability, no need or putting the wheels or axles into the fire, under any circumstances, which is so detrimental to wheels, rendering them remarkably brittle, and which under other systems are detached from the axle by the aid of fire. D, economy in fuel and wages, saving hundreds of pounds yearly to large coal owners. The



important desiderata secured by this invention of simplicity (so often wanted in the progress of mining operations in this country, but have at once been fully recognised by leading authorities in the mining world.

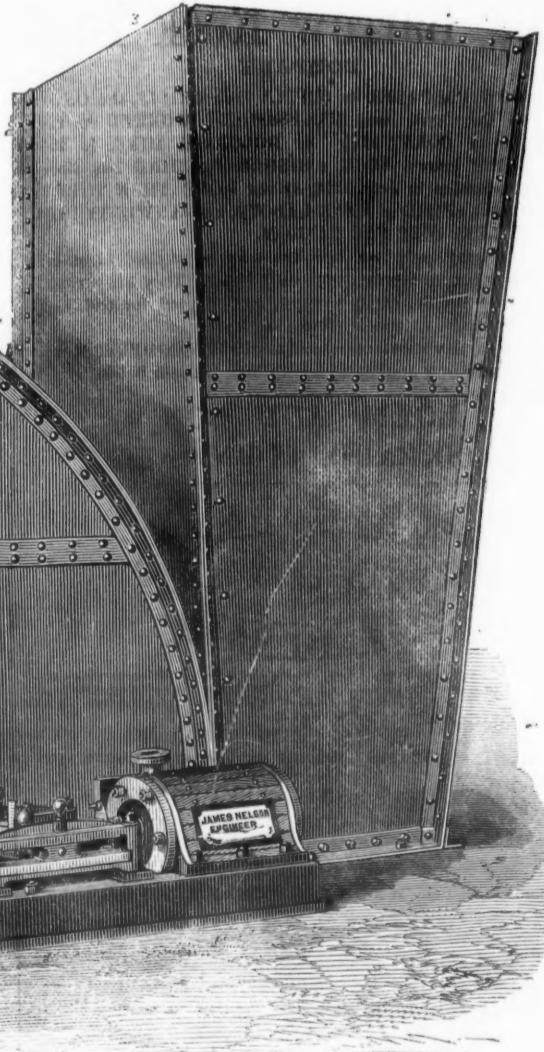
GUIBAL VENTILATING FAN FOR COLLIERIES AND MINES.

PRICES AND PARTICULARS ON APPLICATION.

All sizes up to 40 ft. in stock or progress.

Engines of the most approved class for driving.

Boilers and Ironwork of every description.



MANUFACTURED BY

**JAMES NELSON, Marine and Stationary Engine Works,
GATESHEAD-ON-TYNE.**

H. R. MARSDEN, PATENTEE AND ONLY MAKER BLAKE MACHINES, ORE CRUSHERS AND STONE BREAKERS,

WITH THE

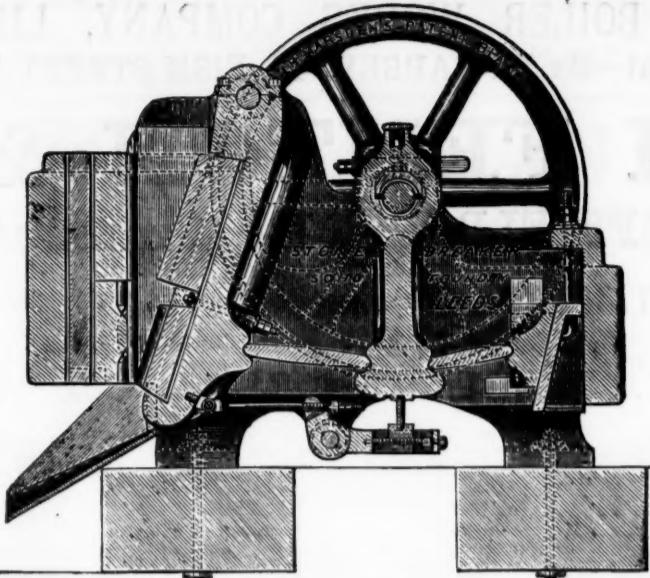
New Patent Reversible
CRUSHING OR CUBING
JAWS,

WHICH ARE CONSTRUCTED OF A PECULIAR
MIXTURE OF METAL, WEARING

Four times longer than any
other.

60 GOLD AND
SILVER MEDALS.

OVER 2000 NOW IN
USE.



FIFTY per Cent., and upwards, saved by using these Machines.

TESTIMONIAL FROM MESSRS. JOHN TAYLOR AND SONS.

6, Queen-street-place, May 10, 1877.

DEAR SIR.—We have adopted your Stone Breakers at many of the mines under our management, and are pleased to be able to state that they have in all cases given the greatest satisfaction.

We are, yours faithfully,

JOHN TAYLOR AND SONS.

H. R. Marsden, Esq.

INTENDING BUYERS ARE CAUTIONED AGAINST PURCHASING OR USING ANY INFRINGEMENT OF THE NUMEROUS PATENTS OF H. R. MARSDEN.

ILLUSTRATED CATALOGUES, TESTIMONIALS, and every information, on application to:—

H. R. MARSDEN, SOHO FOUNDRY, LEEDS, ENGLAND.
ONLY MAKER OF SAULT'S PATENT SYPHON CONDENSER.

TO COLLIERY AND MINE OWNERS.
R. HUDSON'S PATENT STEEL CORVES OR "TRAMS."

Patented July, 1875, and January, 1877.

Entire new principle, saving three-quarters to 2 cwt., "dead" weight per corve. Will hold 2 to 3 cwt. more coal than the ordinary kind, without increasing the outside dimensions. Can also be used as water tube, and in thin seams are invaluable, as the height of the corves can be reduced without diminishing quantity of coal previously contained. In use, or on order, by the following coalowners: FRYSTON COLLIERY CO. (LIMITED), CASTLEFORD, NEAR LEEDS. HOWDEN CLOUGH COLLIERY CO. (LIMITED), NEAR LEEDS. MESSRS. R. HOLLIDAY AND SONS, ARDSLEY, NEAR WAKEFIELD. HARDWICK COLLIERY CO., CLAY CROSS, NEAR CHESTFIELD. MIDDLETON COLLIERY CO., NEAR BRISTOL. T. VAUGHAN AND CO.'S TRUSTEES, SOUTH MEDOMSEY COLLIERY; AND OTHERS.

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The Barrow Rock Drill COMPANY

Are NOW PREPARED to SUPPLY their DRILLS, the ONLY ONES that have been SUCCESSFULLY WORKED in the MINES of CORNWALL. At DOLCOATH MINE, in the HARDEST known ROCK, a SINGLE MACHINE has, since its introduction in July, 1876, driven MORE THAN THREE TIMES the SPEED of HAND LABOUR, and at TWENTY PER CENT. LESS COST PER FATHOM.

In ordinary ends two machines may be worked together, and at a proportionately increased speed. They are strong, light, and simple, easily worked, and adapted for ends and stopes, and the sinking of winzes and shafts.

The company are also prepared to SUPPLY COMPRESSORS, and all necessary appliances for working the said Drills.

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LOAM AND SON,
LISKEARD, CORNWALL.



By a special method of preparation, this leather is made solid, perfectly close in texture, and impermeable to water; it has, therefore, all the qualifications essential for pump buckets, and is the most durable material of which they can be made. It may be had of all dealers in leather, and of—

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TANNERS AND CURRIERS, LEATHER MILLBAND AND HOSE PIPE
MANUFACTURERS,
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Prize Medals, 1851, 1855, 1862, for
MILL BANDS, HOSE, AND LEATHER FOR MACHINERY PURPOSES.

THE GREAT ADVERTISING MEDIUM FOR WALES.
THE SOUTH WALES EVENING TELEGRAM
(DAILY), and
SOUTH WALES GAZETTE
(WEEKLY), established 1857,
the largest and most widely circulated papers in Monmouthshire and South Wales.
CHIEF OFFICES—NEWPORT, MONS.; and at CARDIFF.

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The IRON AND COAL TRADES' REVIEW is extensively circulated amongst the Iron Producers, Manufacturers, and Consumers, Coalowners, &c., in all the iron and coal districts. It is, therefore, one of the leading organs for advertising every description of Iron Manufactures, Machinery, New Inventions, and all matters relating to the Iron, Coal, Hardware, Engineering, and Metal Trades in general. Offices of the Review: 7, Westminster Chambers, S.W.
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SELECTED BY THE BRITISH AND OTHER GOVERNMENTS.

Reduced prices of this Rock Drill, Nos. 1 and 2, £32 and £34.

SUBJECT TO DISCOUNT.

IMPROVED AIR COMPRESSORS.

Makers of Pumping and Winding Engines, Steam Hammers, Boilers, Pump Pipes, &c., &c. Castings of all kinds.

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THE ROANHEAD ROCK DRILL.

BY ROYAL LETTERS PATENT.

This justly-celebrated Rock Drill, the only one invented that will work in the hardest rock without more than the usual repairs required by any ordinary machinery, is now offered to the public.

It has been most successfully worked in the well-known Hematite Mines of Lancashire and Cumberland. Will drive 50 to 60 ft. in hard rock without change of drill, and can be worked by any miner, and kept in repair by any blacksmith. It is the most simple rock drill ever invented, and cannot with fair usage get out of order.

Plans, Estimates, including Compressors, and all other Mining Machinery, supplied on application to the sole makers,—

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Also CHAIN CABLES, ANCHORS, and RIGGING CHAINS, IRON and STEEL SHOVELS, SPADES, FORKS, ANVILS, VICES, SCYTHES, HAY and CHAFF KNIVES, PICKS, HAMMERS, NAILS,

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Crab Winches, Pulley and Snatch Blocks, Screw and Lifting Jacks, Ship Knees, Forgings, and Use Iron of all descriptions.

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